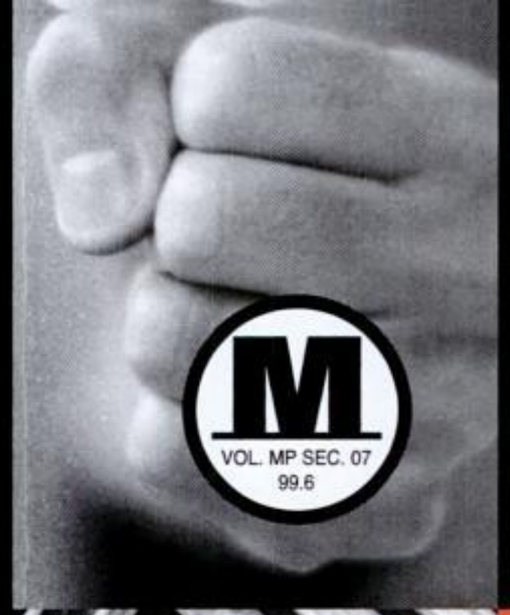

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Monitor	17" Micron 700Cx monitor (15.9" display)	17" Micron 700Cx monitor (15.9" display)	17" Micron 700Cx (15.9" display) monitor	17" Micron 700Cx (15.9" display) monitor
DVD/CD-ROM	40X CD-ROM drive°	40X CD-ROM drive°	6X DVD-ROM drive	6X DVD-ROM drive
Communication	3Com USRobotics V.90 WinModem**	3Com USRobotics V.90 WinModem**	3Com USRobotics V.90 WinModem**	3Com USRobotics V.90 WinModem**
Graphics	8MB AGP graphics nVidia Riva 128 ZX	8MB AGP graphics nVidia Riva 128 ZX	16MB Diamond Viper 550 TnT AGP graphics	16MB Diamond Viper 550 TnT AGP graphics
Sound System	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 128-voice Wavetable sound	PCI 128-voice Wavetable sound
Speakers	Advent AV009 speakers	Advent AV009 speakers	Advent AV009 speakers	Advent AV009 speakers
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Training	1-year free^Δ training @ Micron U online	1-year free^Δ training @ Micron U online	1-year free^Δ training @ Micron U online	1-year free^Δ training @ Micron U online
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Upgrade to:	Upgrade to: 128MB SDRAM 17" Micron Trinitron (16" display) monitor Microsoft Natural Elite keyboard	Upgrade to: 128MB SDRAM 17" Micron Trinitron (16" display) monitor Microsoft Natural Elite keyboard	Upgrade to: 128MB 100MHz SDRAM 17" Micron Trinitron (16" display) monitor Microsoft Natural Elite keyboard	Upgrade to: 128MB 100MHz SDRAM 17" Micron Trinitron (16" display) monitor Microsoft Natural Elite keyboard
Factory Direct Price	$1,649 $44/mo. Personal Payment Plan 48 mos.‡	$1,749 $47/mo. Personal Payment Plan 48 mos.‡	$2,149 $58/mo. Personal Payment Plan 48 mos.‡	$2,449 $66/mo. Personal Payment Plan 48 mos.‡

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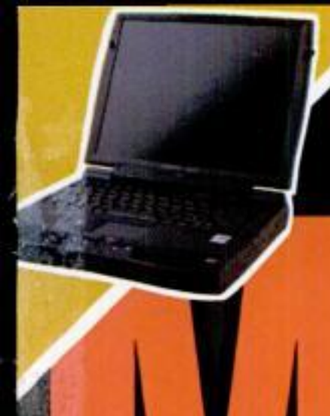

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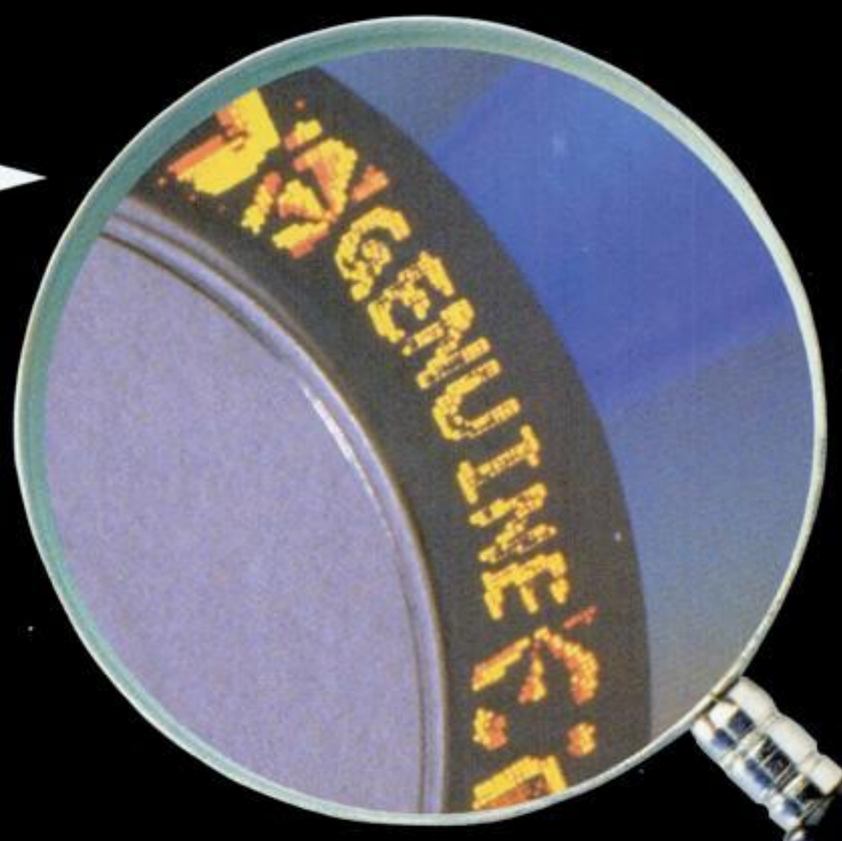

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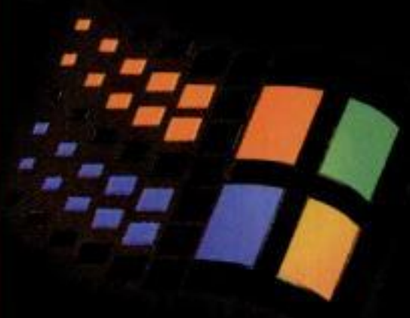

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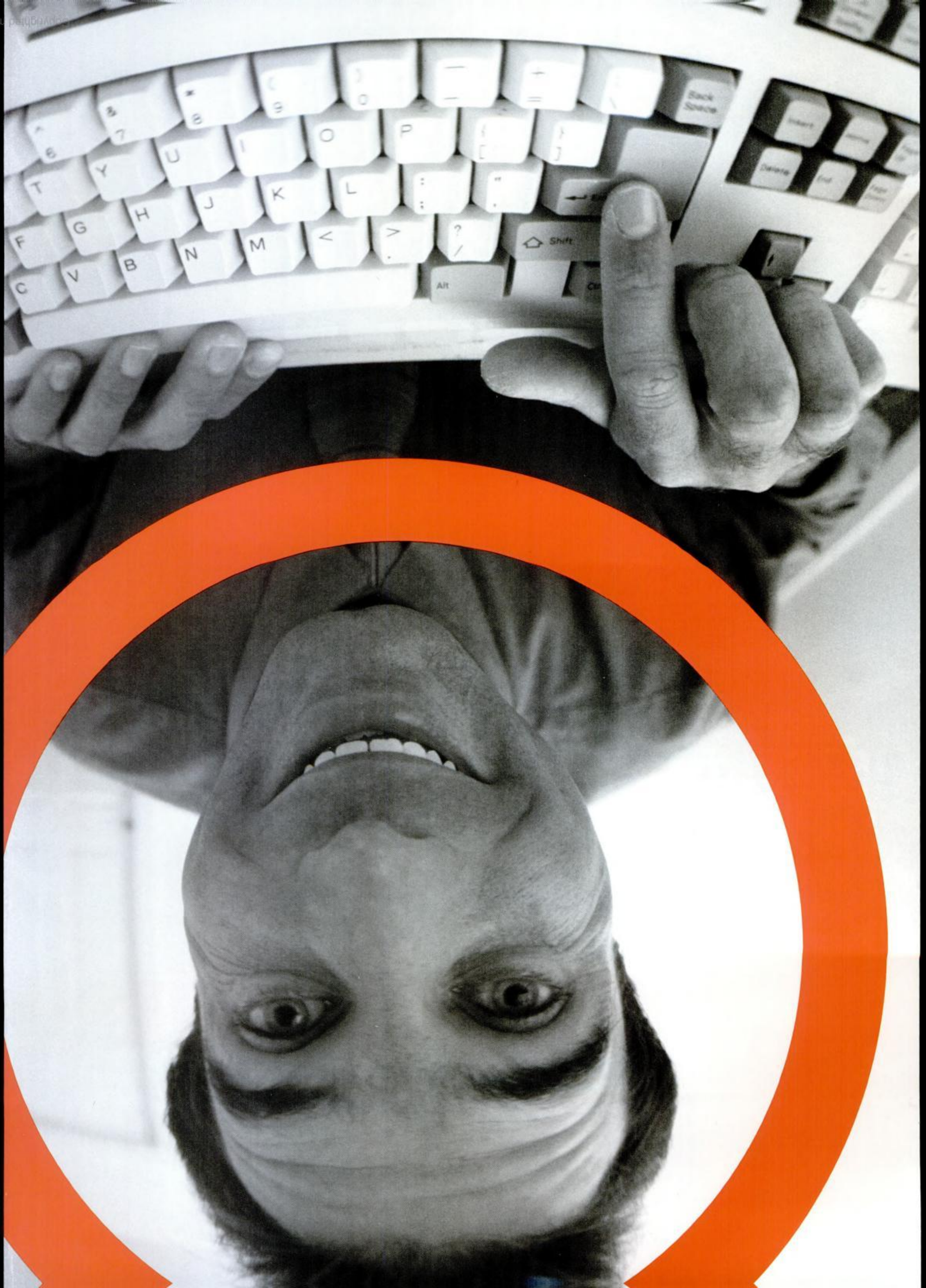

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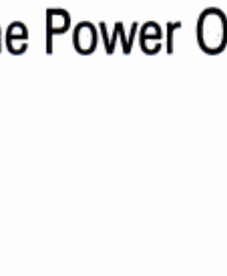

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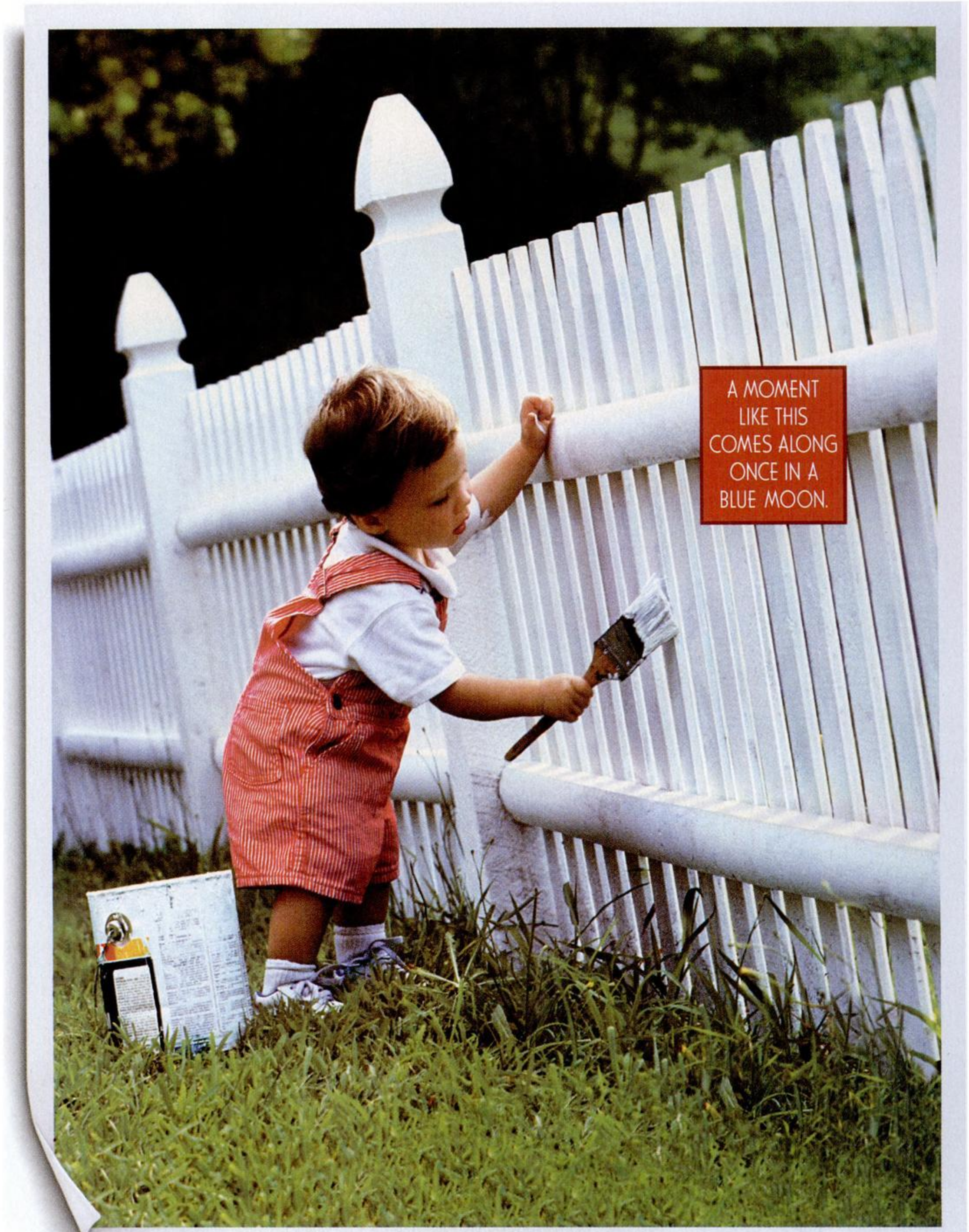

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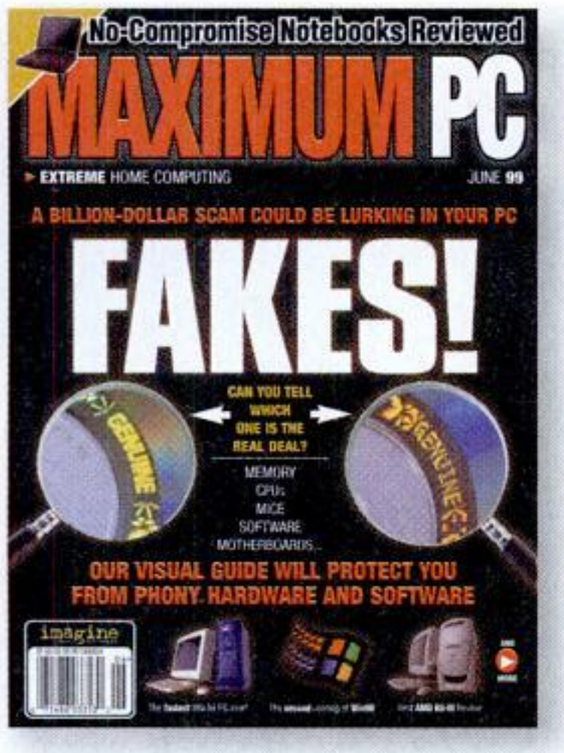
MAXIMUM PC

▶ JUNE 1999

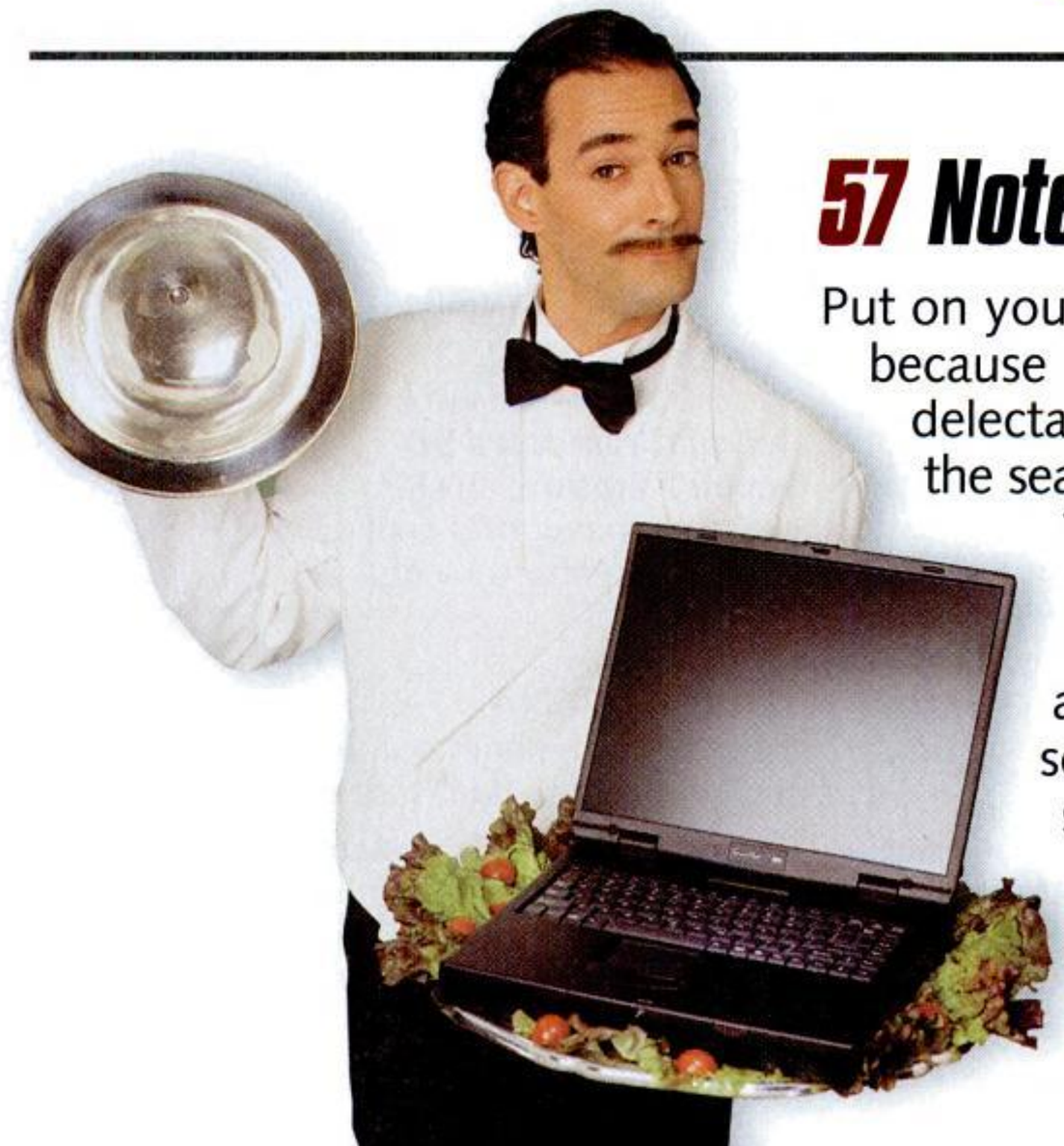


48 SPOT THE IMPOSTERS

How much counterfeit hardware and software do *you* own? Fake PC products—mice, memory, CPUs, and software suites, to name just a few—are flooding store shelves. But you need not fall victim to the old confidence game. Our visual guide shows you how to spot the telltale signs of PC fakery.

42 Interrogation: Diamond Multimedia

Diamond hit the jackpot with the Rio MP3 player. But can the company survive in the vid-card arena now that 3Dfx is playing on its own? Diamond VP and General Manager **Scott Voorhees** thinks so, and explains why he's betting on nVidia's TNT2 for the 1999 3D graphics crown.



57 Notebook Buffet

Put on your lobster bibs, diners, because it's time to savor the delectably sweet circuitry of the season's freshest notebooks. Today's menu features the fastest CPUs, the most-powerful 3D accelerators, the largest screens, and the-most sophisticated features.

Enjoy your meal...

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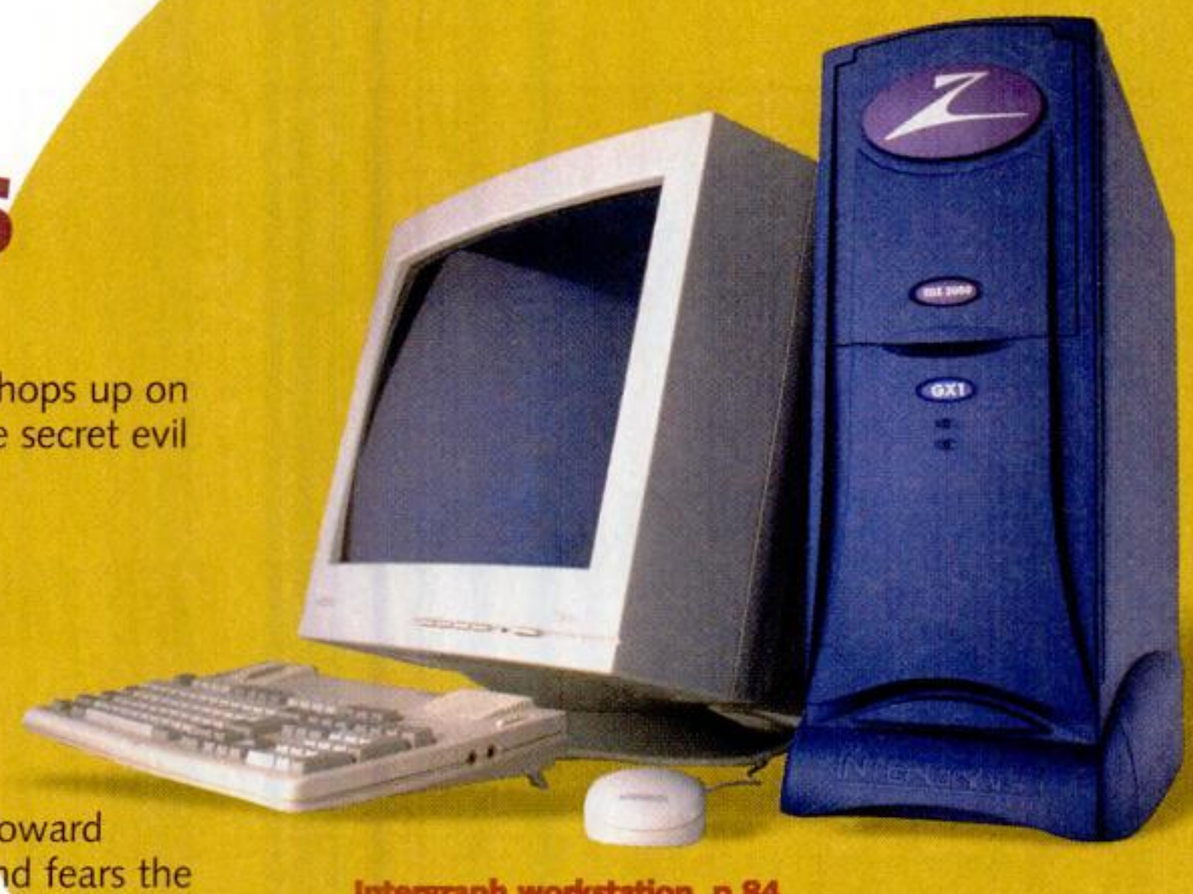

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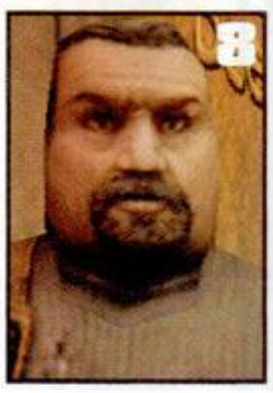

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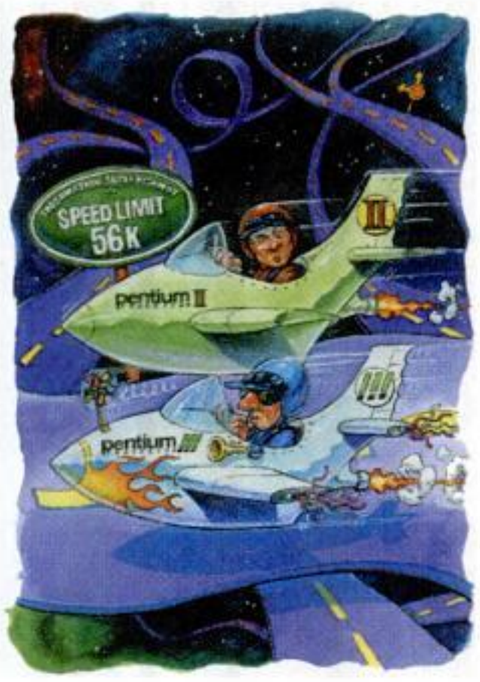
News for discriminating tech-heads

▶ The **Pentium III** is a Pentium II in drag, steals your privacy, and doesn't give you a dime in performance increases. At least that's what its harshest critics say. We debunk the current conspiracy theories and judge whether the P-III is guilty as charged.



▶ **Also:** Buying online may be the road to the future, but there's still a few landmines in your way.

And in this month's **Spin Cycle**: Linux increases velocity, while Microsoft preps its own MP3 alternative.

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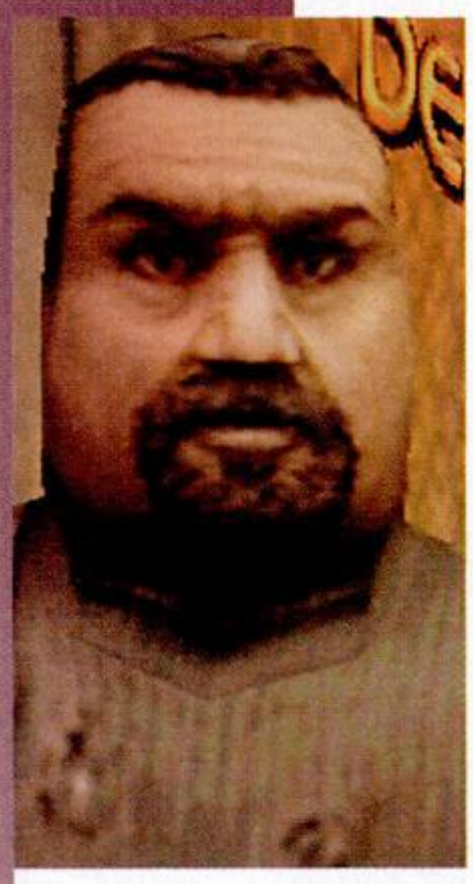


"Faux PCs are fraught with all the hassle and complexity of their full-benefit brethren, but without any of their power."

You don't have to look very hard to find some "philanthropist" who hails the Internet as the great leveling force in society's class schism. "This technology will break down barriers of race, gender, and age discrimination," they gush. And now the purveyors of bargain PCs have followed in this path, promising fulfillment of the democratic dream as the huddled masses finally have access to the Great White e-Way.

Less savvy magazines may beckon the rubes with covers that spotlight "Free PCs," but how many times do you have to go hungry before you learn there's no such thing as a free lunch? No matter how much of a commodity item PCs may become, they will never be free. Someone's going to pay, and that someone is the so-called beneficiary of this gift.

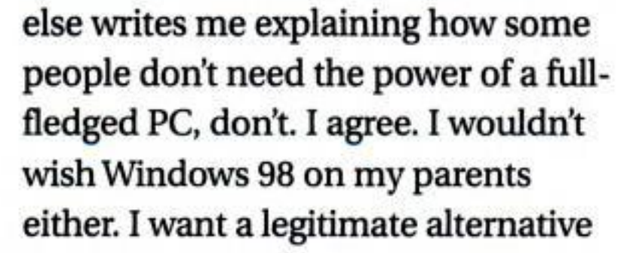
Many of these ghetto systems operate on the cell-phone business model: You get a deal on a bare-bones system... if you sign up for an extended service contract with the company's ISP. Over the course of the contract, factoring in a predetermined renewal rate, you pay the price for the PC in recurring installments. This way, no one's too poor to have a PC. And hasn't credit always proven to be a tremendous boon to the financially challenged?

Other offers are tied to constant on-screen advertising. Essentially, more people online means more people to sell to. Clever market research showed that a vast sea of potential online shoppers were doing business in analog. And this just wouldn't do. Give those custom-order customers PCs and they'll beat a path to your e-commerce. Again, you pay for the PC indirectly. This arrangement is reminiscent of land developers who graciously put up housing projects for the working poor at self-sacrificing rates, all the while eyeing the leases with check-cashing businesses and rent-to-own outlets.

I don't have a problem with getting a good deal. I'll be happy when the tech sector becomes a genuinely competitive business, not a factory spewing spoiled 20-something millionaires jockeying for the fastest Ferrari. It's tragic that Al Gore didn't make the Internet a public utility back when he first "invented" it. I can see a time not far from now when every room in the house has an embedded system that defies fouling and an inexpensive TFT sufficient for accessing the Internet. Hell, we've already seen affordable hardware from big-name companies that accomplishes just this. But this hardware has more in common with the console game system sitting on top of your TV than a true PC.

A PC's power is rooted in its versatility and that versatility comes from some key aspects missing from the compromise machines shipping to the untapped market. Essentially, these bargain boxes are like a cheap sofabed that fails to satisfy as either sofa or bed. Many of them began life as ill-fated NCs and have just enough integrated parts crammed under the hood to boot. Faux PCs are fraught with all the hassle and complexity of their full-benefit brethren, but without any of their power. And before anyone else writes me explaining how some people don't need the power of a full-fledged PC, don't. I agree. I wouldn't wish Windows 98 on my parents either. I want a legitimate alternative that doesn't cheapen the PC name.

Still, let's not lie to ourselves. Trying to convince a PC owner to convert to an NC is like trying to explain the virtues of renting to a homeowner. And justifying underpowered PCs for the economically challenged as a great leveling force is just not honest.



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Editor in Chief

MAXIMUM PC
jun99 vol4issue6

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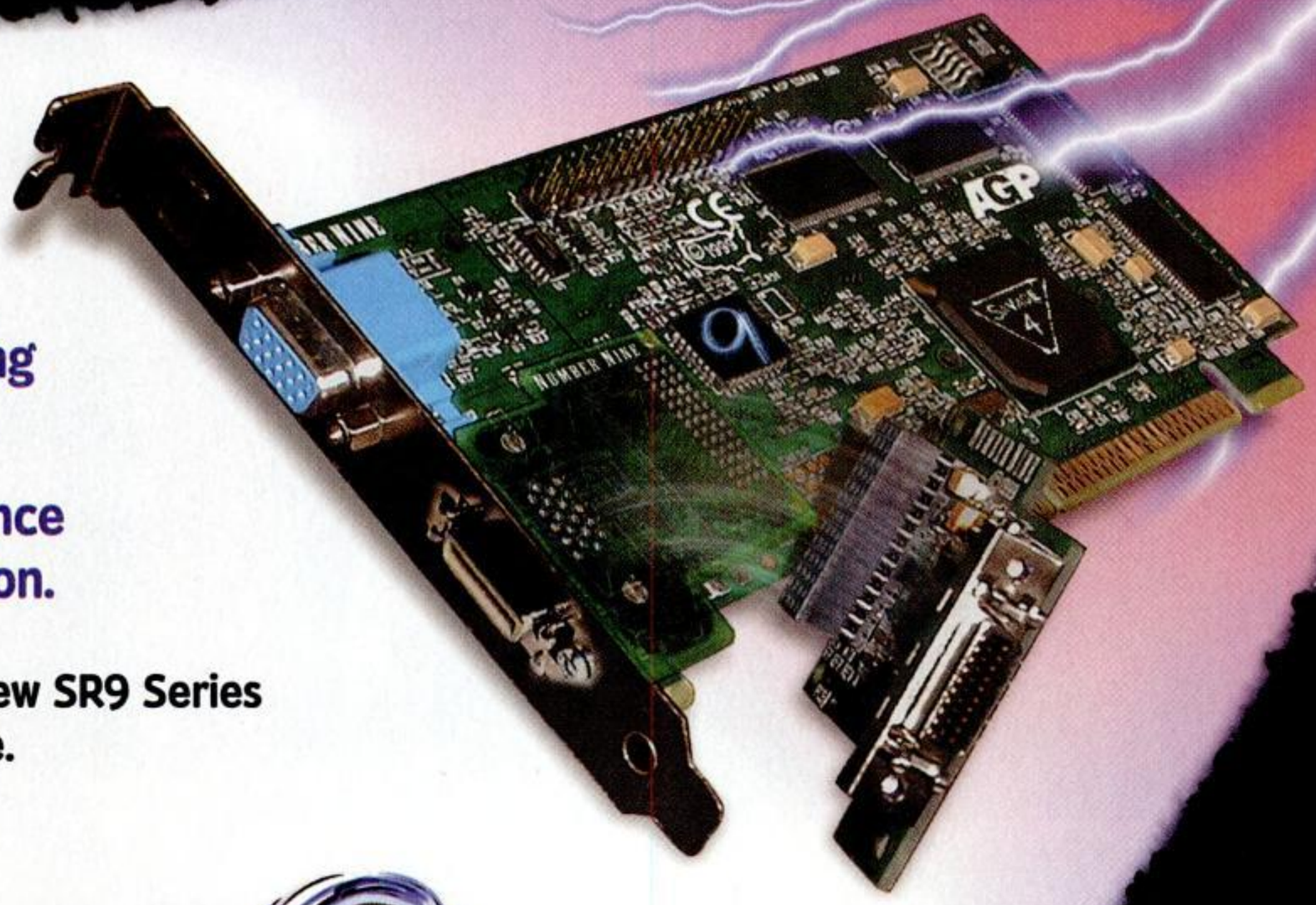

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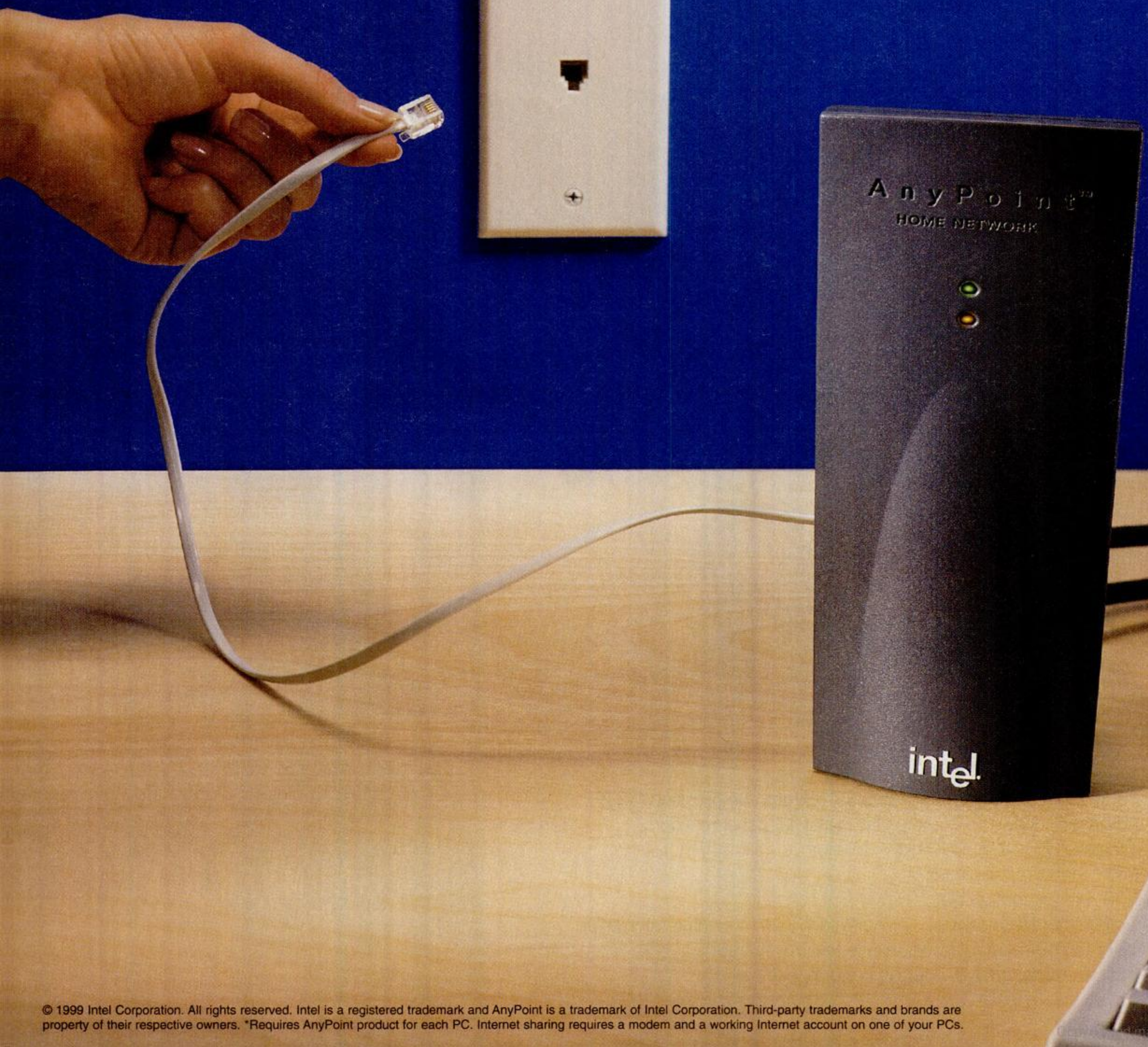

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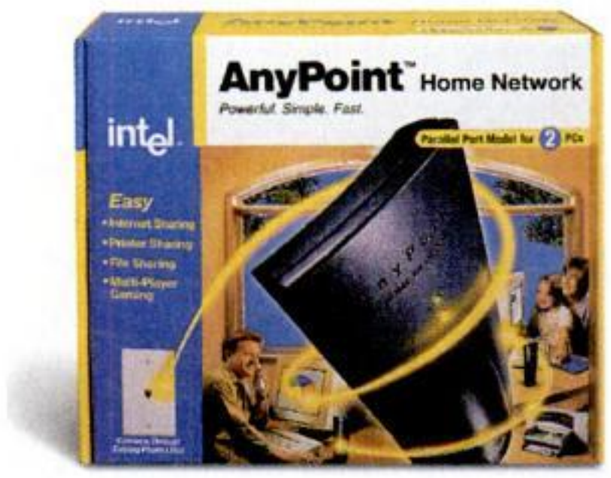

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Electric Company

Why the hell can't printer and scanner manufacturers incorporate the power supplies inside their products? Those bulky adapters take up way too much real estate and, if plugged into a wall socket, invariably fall out.

—Roy

News Editor Gordon Ung replies: The real reason is that multinational power-strip conglomerates own all the scanner and printer companies. They know if we have a scanner, printer, and PC, we'll need two power strips just to power the sucker up.

Another more reasonable answer may be that the devices are sold internationally and making an external power supply makes it easier to sell products internationally. And it's even a good idea domestically sometimes. If your power supply craps out, all you have to do is order another power supply instead of shipping the whole unit back for repair.

Rock Around the Underclock

While reading *Maximum PC*'s overclocking article (April 1999), I understood why some people would be willing to risk it all for the prospect of sheer speed. But what about people who actually want to preserve their PCs? What about those of us who want to protect it for as long as possible? I know that to even bring this idea to the icon of speed magazines is a blasphemy, but what the heck...

Is underclocking such a bad idea? Is it worth it? If a chip's life has been determined by its average use under normal operating conditions, wouldn't lowering those conditions lead to longer chip life? If I underclock my P-II 450 to 400, won't that technically be conducive to longer chip life? The chip would be running at a slower clock speed, but still plenty fast for anything that's out there today. It'd be running cooler too, because we all know speed equals heat, right? Would running at a slower speed sacrifice any features besides the speed? For instance, would running a P-III 500MHz chip at 400MHz hinder the new instruction set built into the chip?

—Slownlo

Executive Editor Jon Phillips replies: CPU giants factor a lot of breathing room into their heat specs. Your 450 P-III is built according to a 0.25-micron process. 500MHz and 550MHz P-IIIs are also built according to a 0.25-micron process, which suggests your 450MHz has 100MHz of breathing room. Sure, the faster procs need more efficient heatsinks and increased fan action to ensure operational stability, but clearly the 450MHz processor has some wiggle room. Shoot, even 333MHz P-IIs are fabbed at 0.25-micron! One can only imagine how fast they can go before failing (it's fun to fantasize, but now is a good time to note that CPU companies can improve speed-to-heat-generation efficiency during the lifetime of a single manufacturing process and sort chips accordingly, clocking the more efficient chips to higher speeds.)

"If I underclock my P-II 450 to 400, won't that technically be conducive to longer chip life?"

Second, you have to consider why you'd want to add five years of life to a chip that will be obsolete in two years anyhow. The Pentium 200 with MMX is about three years old—don't you wish you had underclocked yours so that it will last until 2007?

Third, underclocking a 500MHz P-III to 400MHz wouldn't have any effect on the execution of SSE instructions, but lowering the speed of the system bus could affect other computer processes that use the system bus as a constant metric.

Separated at Birth?

Gordon Freeman (*Half-Life*) and T. Liam McDonald (*Maximum PC* Game Guru)... You be the judge. I only noticed it when the April issue had a *Half Life* ad on the opposing page and they look very similar indeed.

—Jamie M. Morris

Resistance is Futile

In response to Tom Halfhill's column in the March 99 issue of *Maximum PC*, I don't agree with his opinion that giving Win 9x OSes "browser capabilities" is just a logical evolution of an OS. Your argument about the trend of network connectivity (remote disk drives on servers on the Internet) justifying Microsoft to integrate *Internet Explorer* into the Win 9x platform is flawed. You must know that there is so much more to the Internet, such as chatting, hyperlinks, running applets, buying goods online, viewing movies, listening to music, etc. (And network connectivity is *not* a trend. It has *always* been there. Or is there no Unix in your world?)

This month:
- Over/under clocking
- Tom Halfhill fights back—again
- The trouble with SCSI
- Gilligan's modem

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Netscape decided it would be nice if there were just one program that could be the front-end for all the things on the Internet, so *Navigator* filled that void nicely. According to your reasoning, it's just coincidence that Microsoft integrated *IE* into Windows after Netscape rejected Microsoft's offer to buy the company.

Come on!

Here's a scenario for you. Let's turn back the clock to the age just prior to the demise of typewriters. But let's say Microsoft is the monster it is today. You and I make a program called *WordPerfect* that will do word processing on a computer using the Windows platform, and after a few months it becomes a huge hit. Microsoft sees that word processing on a computer will become a significant trend, so it offers to buy our program. We refuse. A few months later, Microsoft integrates a word processing program called *Word* into its OS. What's the point of making programs if every time somebody comes up with some great innovative software, Microsoft just adds the damn thing into its OS. Why bother making software anymore?

—Paul Park

Columnist Tom Halfhill replies: Of course, I don't think it's a coincidence that Microsoft integrated its browser into Windows while it was locked in combat with *Netscape*. Obviously, Microsoft was trying to stomp *Netscape*. Everybody knows that.

All I'm saying is that networking has become such an integral part of computing that integrating that function into the OS is both logical and consistent with historical trends. As you pointed out, Unix has been doing it for years.

Note that Microsoft also includes a word processor (WordPad) and even a solitaire game with Windows. True, they aren't integrated to the degree that *Internet Explorer* is, but then, they don't need to be. And you can still install your own word processor or solitaire game, just like you can still install your own web browser or e-mail client or newsreader.

What about multimedia functions? Aren't you upset that Microsoft has integrated graphics and sound APIs into Windows? Direct3D is the default 3D graphics API. You can still install OpenGL if you want. You can also install your own WAV player or audio CD player, too, even though Microsoft has integrated those components.

What about the GUI? Integrating the Windows Explorer (formerly File Manager) into Windows has certainly dampened the market for third-party GUI shells, hasn't it?

My point is that we have to separate Microsoft's nefarious motives from technology trends that would have happened anyway. Even if Microsoft integrated *IE* into Windows while thinking evil thoughts, it was an inevitable step in OS evolution.

The ISP Minnow

I'd like to get cable modem access, but there's one problem: I live on an island, and out here we don't support cable television access. Is there a way to still get cable modem access without having to string a cable modem across the bay?

—Rory Diffin

"I live on an island. Is there a way to still get cable modem access?"

News Editor Gordon Ung replies: I'd ask the Professor to help rig up a cable system using coconut technology. That man can cook up a mean ATM network with just leaves and bamboo shoots. Realistically, you're best bet is to use something like Hughes' DirecPC. Although it requires an analog modem out, you can hit up to 400Kbps downstream. There have been reports that the latency isn't suited for gaming at all. But if you need to browse from a remote island, it may be your only choice, little buddy.

Notebooks Suck

What's the deal with notebook computers? I mean, they're catching up with desktops in terms of CPU power, but why do manufacturers still saddle them with crappy video chipsets and terrible pointing devices? With the new .18-micron processes, you'd think a lower-clocked Banshee or TNT chipset could be integrated into some of these high-end notebooks. Or better yet, forget onboard video and dedicate an expansion slot for

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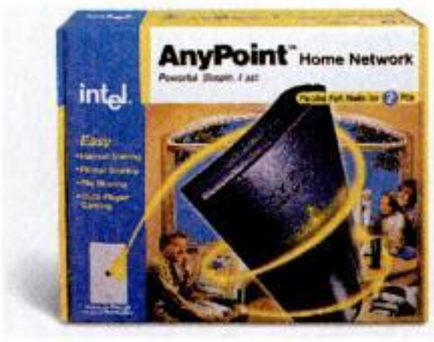

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video. And what happened to the good old days of notebooks with trackballs?

—Michael Baxter

Senior Editor Bryan Del Rizzo replies: Notebooks are definitely catching up to their desktop brethren. And come this fall, Intel's Geyserville will, at least according to the company, close the gap completely.

And you're right—many notebooks are saddled with lousy video and audio. But that's the mistake of the notebook vendors. Frankly, I'm less concerned with sheer MHz speed than with how well the entire notebook is integrated. But there are new mobile graphics technologies coming down the pike from such companies as ATI, Trident, and NeoMagic. We'll preview these new chips in our next issue.

"Banshee or TNT could be integrated into some of these high-end notebooks."

In the meantime, be sure to check out this month's "Notebook Buffet" on page 57. You'll find many new notebooks that are very tasty indeed.

Between a Rock and a Hard Drive

After reading your review of hard drives, I went out and bought one. But nowhere in the review did you make clear that one needs an Ultra 2 Wide controller. The controller has to be LVD-compatible if I want to get the most out of the drive. Now I have to go out and buy a new controller, and the old SCSI drive will *not* work with that one. If I want to use the drive as regular SCSI, then I have to go out and buy an inline terminator and an LVD cable kit from Adaptec.

Since the vendor will not take the drive back once it's opened, I'm hosed. When doing reviews, clarify the full requirements and potential problems.

—Sonam Gyato

Tech Editor Sean Cleveland replies: All of this was explained in the sidebar titled "Ultra 2 LVD SCSI." But don't fret, the drive will work just fine on any older Wide Ultra SCSI host adapter—you just won't get the high burst rates. The throughput, seek, and random-access times will all be the same, regardless of whether you're using an Ultra 2 host adapter. In fact, the burst rates are still high at 27MB/sec (instead of 55MB/sec).

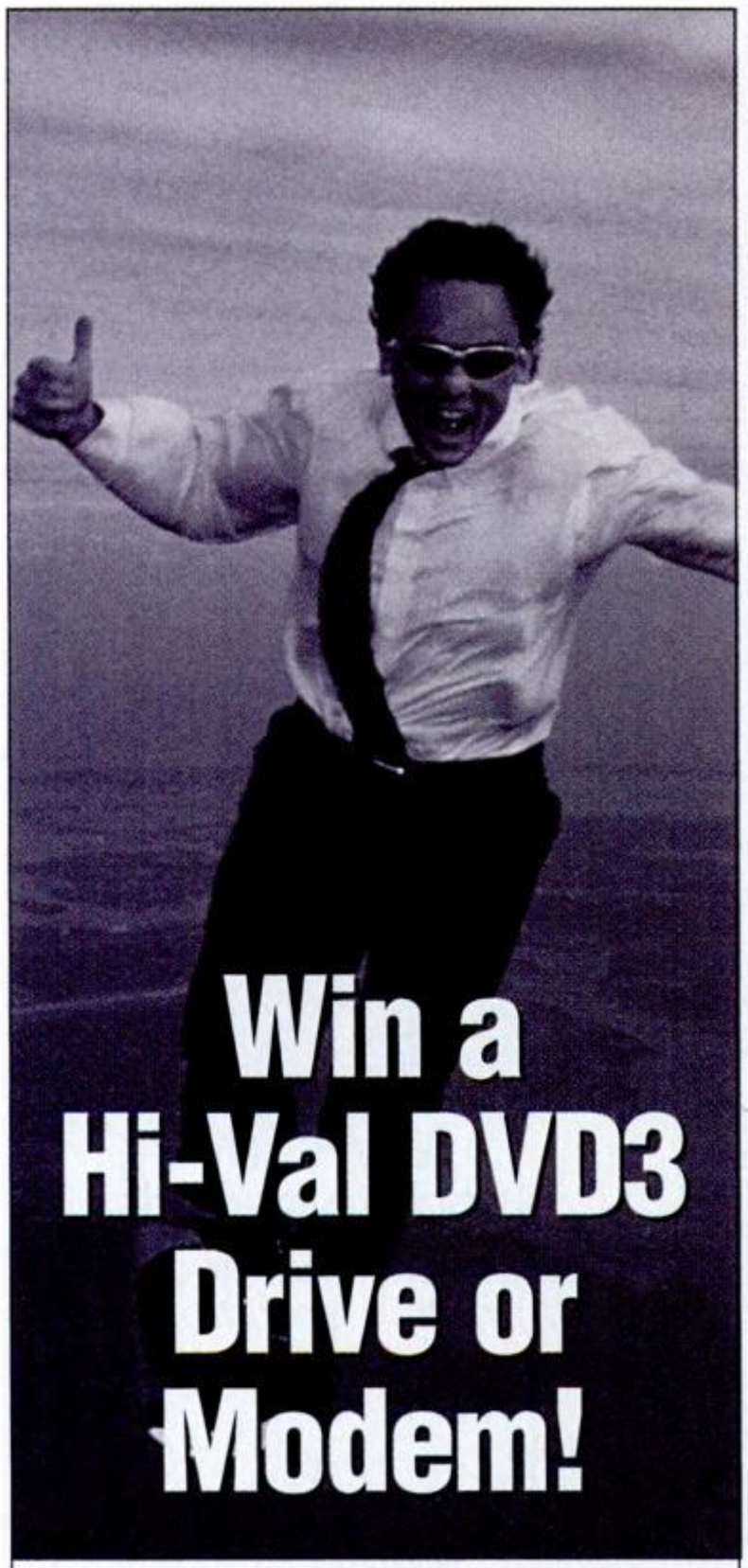
Also, your old hard drive *will* work on a newer Ultra 2 host adapter. The 2940U2W from Adaptec includes connectors for both Ultra 2 devices and Wide Ultra devices, and even one for narrow devices. Even if you bought a host adapter with a single Ultra 2 connector, your older Wide Ultra SCSI devices would still work—it would just bring the overall speed of the Ultra 2 device down to the slowest SCSI device.

If you're only planning on buying this single drive and decide to buy a new controller, we recommend the Adaptec 2930U2W. It's designed and optimized for a single drive, comes with a 50-pin SCSI-2 connector externally instead of the 68-pin SCSI-3 connector, and has Ultra 2, Wide Ultra, and narrow 25-pin connectors internally. It's also more inexpensive.

Evil Rebates Part Deux

I urge everyone partaking in this farce we call "the computer industry" to never judge a purchase on what you expect to get back from the company. Conditional rebates, performance problems, and most of all false consumer advertising are running rampant.

Don't get suckered by a supposedly good deal. Computers, software, and peripherals must be thought of as impulse buys. If you can't afford it without the $300 rebate they promised, don't buy it. If they can afford to give you the money back after you buy it, then they can afford to charge $300 less for it in the first place! I have worked in computer sales for many years now and have seen rebates come and go, and I will never buy anything simply because of a rebate. Several products I bought promised rebates, such as the Zip drive's $50 rebate, of which I never saw a dime. Now I just wait for the price to fit my budget, and they can keep their rebates. If we don't buy overpriced items with the promise of our money back later, they will eventually simply lower the prices. When some game company's $49 expansion pack (which should be free in



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the first place) with a $20 rebate upon proof of purchase of the original game (which you had to send in to get the first rebate and never got back) sits on the shelves for a month, they might get the hint. People have better, less expensive things they could spend their hard-earned money on. They should use instant rebates or not even bother with it in the first place.

—Chris McGaughey

3D Manifesto Redux

While Bret Sadler (Comm Port, April 1999) may be good at writing the kind of poetry that the writers of "Kung-Fu: The Legend Continues" would be ashamed of, he is certainly bad at his gaming analysis.

Direct3D is not only the most deficient of the three major APIs, it is also the slowest, and certainly the buggiest. Well, being a hardcore gamer, I can tell you that not only is OpenGL the most stable API I've ever used, but the fastest, the cleanest, and the most feature-packed a consumer could ask for! Never once have I had an OpenGL game crash using any 3D accelerator.

As for D3D? Well, if I could play one game without my computer getting an aftertaste worse than Pepsi One, I would kneel and thank whatever controls miracles.

"Quake II is pants-wetting fast. It also rarely crashes, hiccups, or spits."

And is Glide really a technological marvel? Heck no! It's basically an optimized OpenGL API, with some modifications here and there.

While it's true that Direct3D supports more chips (and dips) than you can shake a card at, all the major ones sold anymore also support OpenGL. *Quake II* is the prime example. Not only is it pants-wetting fast, it also rarely crashes, hiccups, or spits when using default OpenGL. (Glide Mini-GL, however, is horrendous compared to that)

But I must congratulate Bret on waking up to the fact that 3Dfx will soon be extinct. Voodoo^3 is not a sham, but a total and miscalculated failure. Not only will it drag its rear-end behind TNT2, it also won't support SLI (the biggest reason for V^2's success). TNT2 will support SLI through Metabyte and others. Add to that limitation of selling only through one board maker with horrible OEM support and pint-size sales compared to Diamond and Creative, and you have a recipe for disaster worse than sending Bill Clinton to MTV's *Spring Break*.

—Joe "Farely" DiDonato

Any Gameport in the Storm

Reading your January 1999 article about USB devices, I couldn't find a gameport-to-USB converter? I've even looked everywhere on the web and at computer stores, but I can't find one.

—Christy Horne

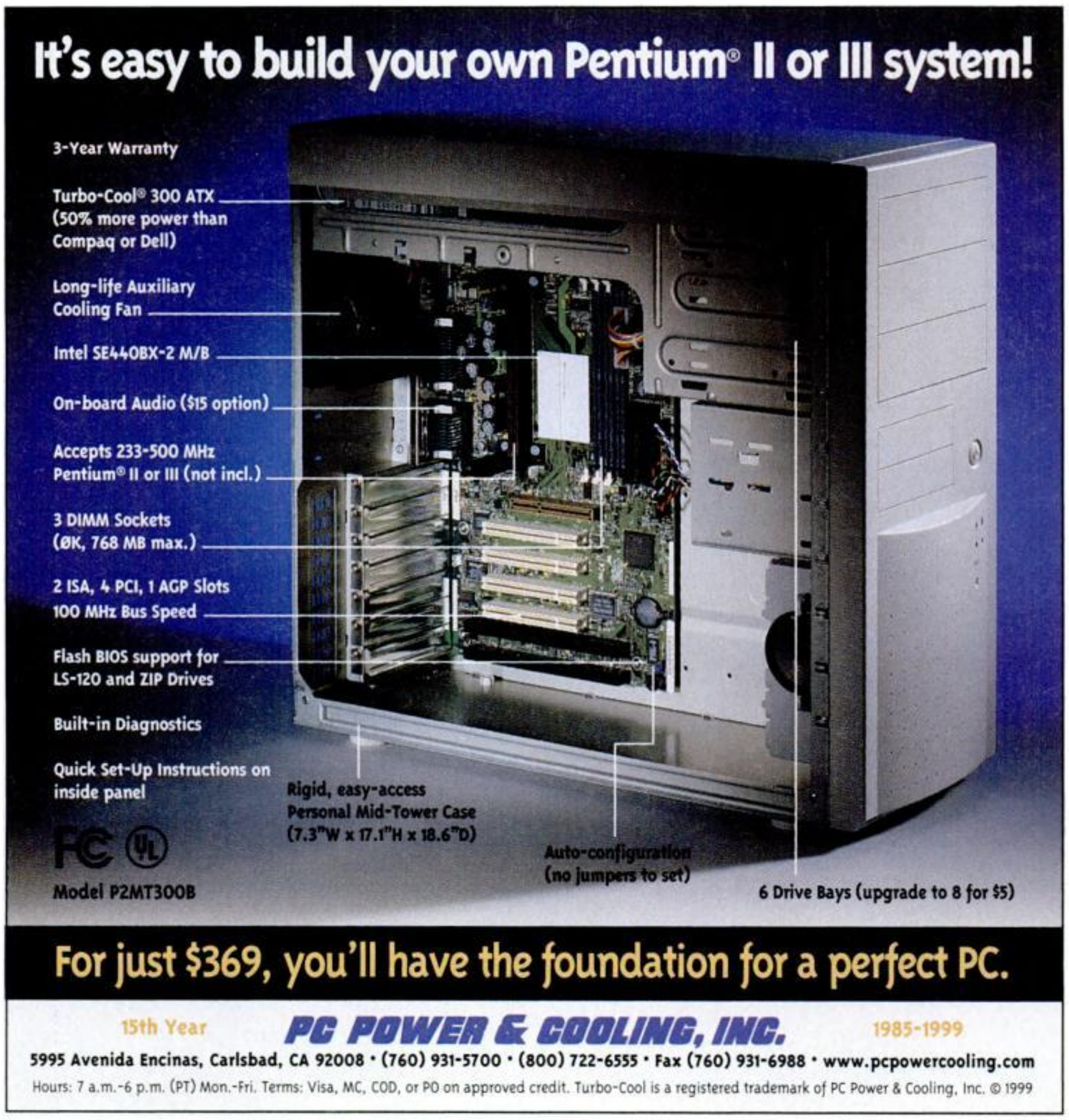
Senior Editor Bryan Del Rizzo replies: You and me both. I've seen the adapters, and I have a couple that were sent to me by Microsoft, but so far, you can't buy them at retail. Several vendors we spoke to, including Belkin Components (**www.belkin.com**), plan to sell them, but so far, they're still in preproduction.

Running Up That Halfhill

Tom Halfhill would have been better off without the rebuttal in the March 99 bootReport, it has so many logic errors it comes across as just embarrassing defensiveness.

"...Developers have rewritten relatively few programs to take advantage of MMX..." For a revolutionary architectural expansion from Intel, surely that's the very definition of a flop?

Later in the same article, he argues that "CPU architects are going to extreme lengths" [in adding SSE], which shows that this feature is vital to software developers. Now wait... MMX was vital to developers but... what, they're just too dumb to know it? Otherwise, MMX proves that CPU architects do in fact design things that turn out to be irrelevant, driven by dreams, desperation, or (hmmm...) marketing! I don't suppose you remember the iAPX432? Or the i960?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I won't hit every single bug in your program, but this one's egregious: Geometry may or may not be the least important part of the rendering pipeline, but saying that it's at the front of the pipe—this has no bearing on its importance. When I drive to the store, I start by opening the car door. What does this tell us about the importance of door handles in getting to the store quickly?

"MMX proves that CPU architects do in fact design things that turn out to be irrelevant."

If that article wasn't such a great example of bad argument, I'd be mad that you wasted my time!

—*Spike McLarty*

Columnist Tom Halfhill replies: Thanks for your comments on my article. However, I don't buy your arguments.

Although it's true that developers have rewritten relatively few programs for MMX, it's also true that relatively few programs really need MMX. Or, at least, relatively few programs need MMX bad enough to justify rewriting the code. That's why MMX code is most often found in games. They do need MMX, and there's not much legacy code in game software.

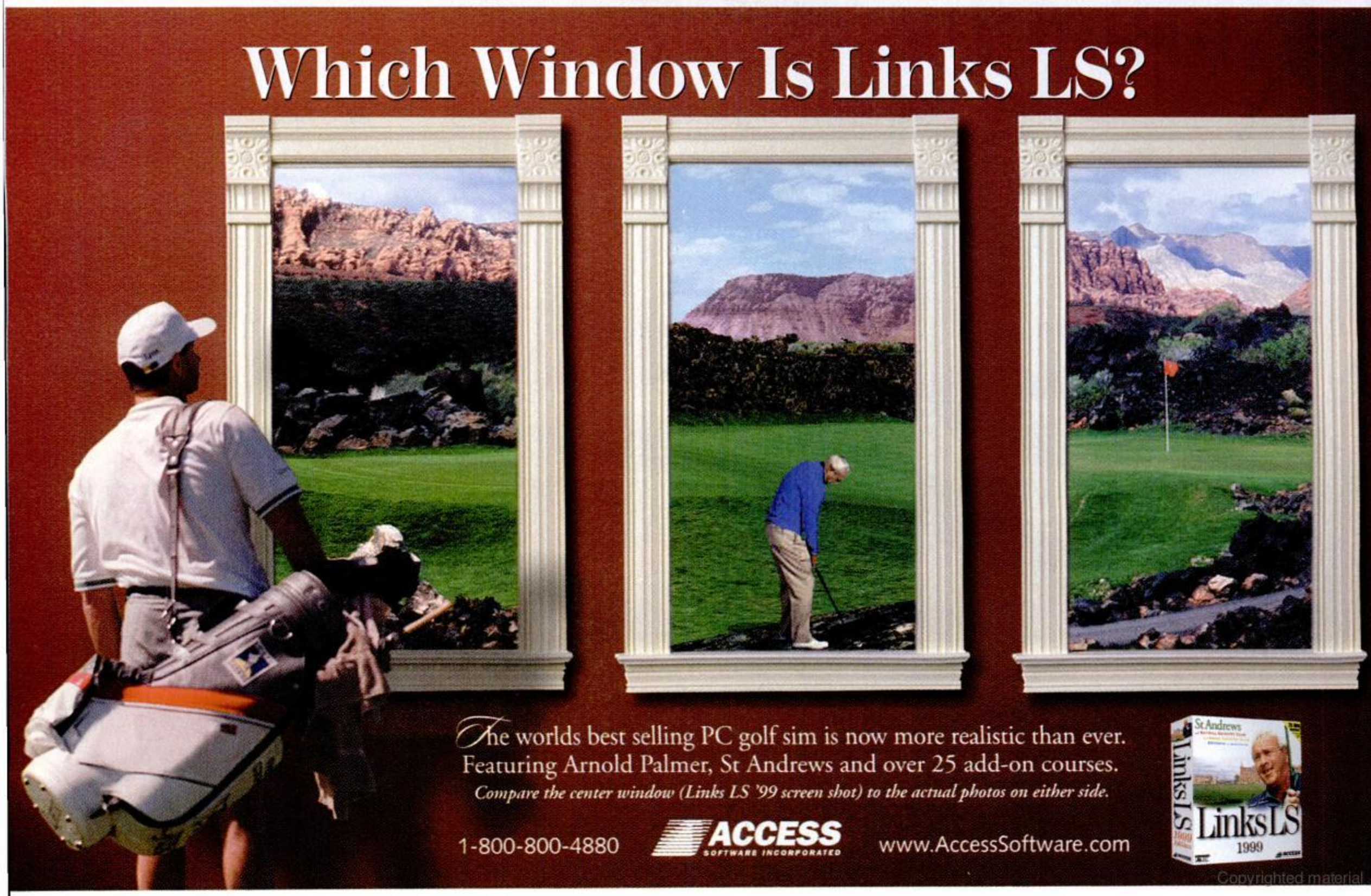
You're right that CPU architects sometimes design things that turn out to be irrelevant, but MMX and SSE aren't among them. It's not a coincidence that architects have added similar instructions to SPARC, Mips, PowerPC, Alpha, and other CPU architectures. Is everybody wrong? I don't think so. Going forward, all new instruction sets will surely include these kinds of instructions, too. Just wait until Intel discloses the IA-64 instruction set.

BTW, what's irrelevant about the i960? As a workstation CPU it was a flop, but Intel successfully repositioned it as an embedded CPU and it has done quite well, thank you.

Finally, the importance of geometry transformation in 3D graphics is that it was quickly becoming the weakest link in the processing chain. As I've pointed out before, the FPU in the latest Pentium III is the same as the FPU introduced in the Pentium Pro in 1995. In four years, only the clock speed has changed. Meanwhile, graphics processors are advancing by leaps and bounds. A chain doesn't get any stronger if you don't strengthen every link. SSE doubles the number of single-precision FP calculations that old FPU can handle, and SSE's 128-bit registers provide headroom for the performance to double again in a future FPU. If you don't think that's important, stick with a Pentium II.

Cut, Copy, Paste

Due to a production error, we incorrectly reported the scores in the benchmarking charts on the top of pages 68 and 69 in May's CD-Recordable feature. Essentially, the scores were listed in inverse order. In other words, in each chart the last score actually applies to the first drive listed, the next-to-last score applies to the second drive listed, and so on. The corrected benchmark charts can be found at **www.maximumpcmag.com** in the Re:Print section.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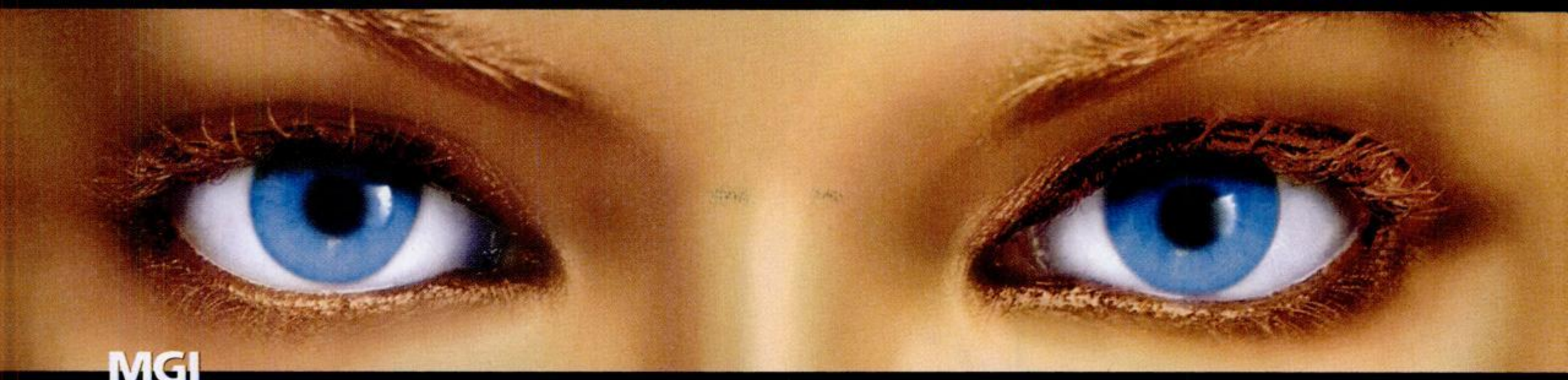

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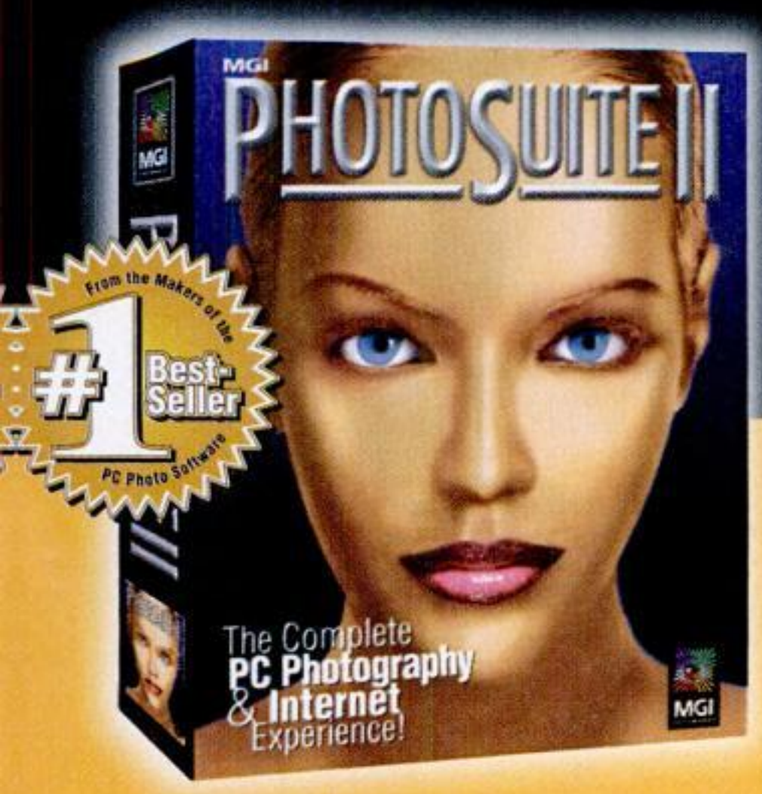

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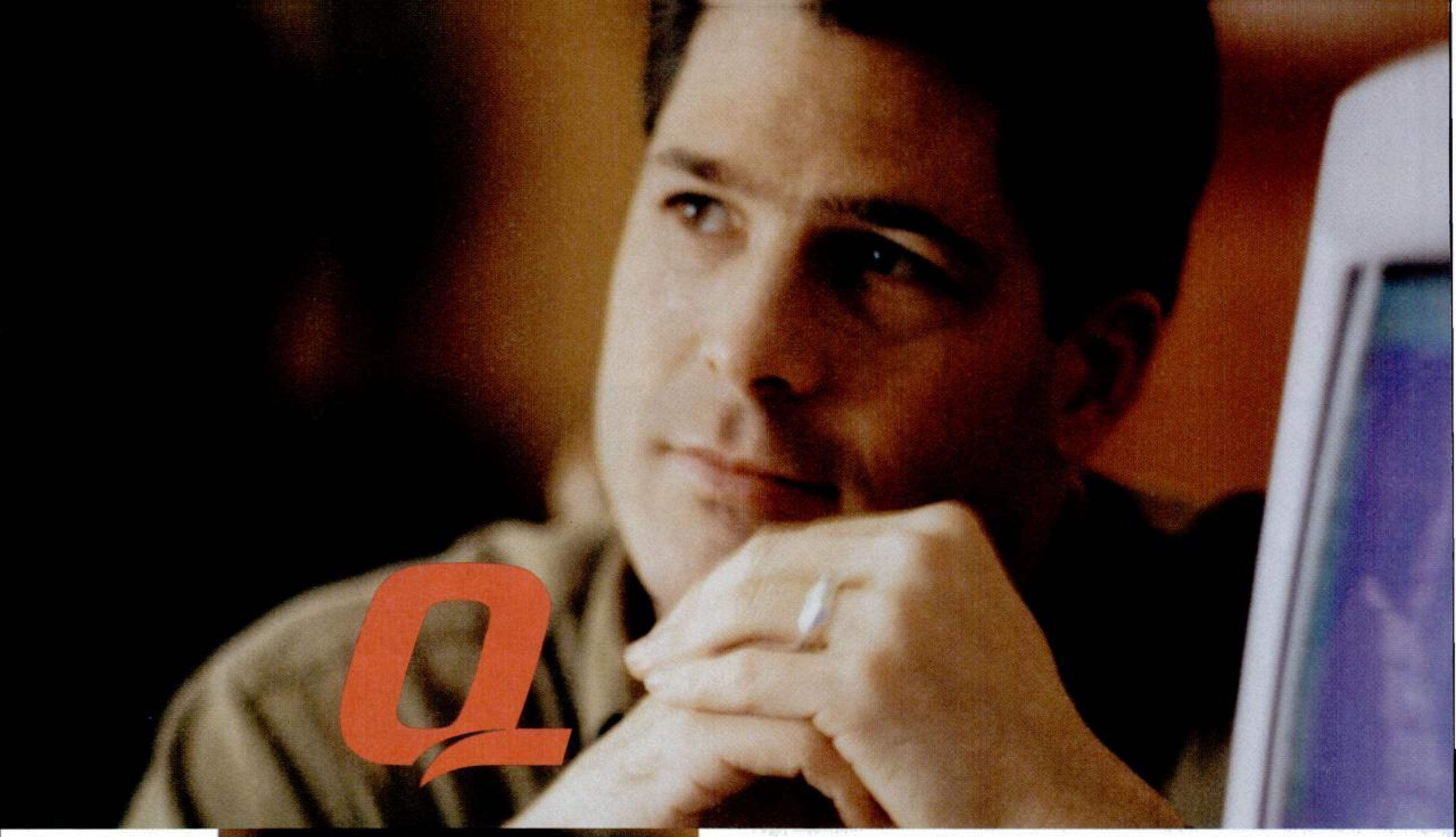

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	Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
	6.0Mb Max Digital Modem[6]	56K ITU V.90 Modem[2]
	JBL Pro Studio w/Dual Subwoofers	JBL Pro Speakers
	Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]
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"It's my turn to go online." "No, it's my turn." "Is not!" "Is too!" Was this what the Internet promised? The people at Compaq don't think so. That's why we created these new Compaq Presario 5600 Internet PCs. They're the first computers with Home Phoneline Networking,[7] which lets you plug your family's PCs into your home's phone jacks. This allows everybody to surf the Net at the same time, on the same phone line.[9] So while dad e-mails his college roommate, the kids can visit their school's Web site. You can also share printers, files, and games. And there's more, like one-touch Internet access and 50 free hours on the Net.* And with our 6.0Mb Max Digital Modem,[6] which works with your 56K dial-up access sources, you can switch to DSL service for lightning-fast surfing as soon as the service becomes available in your area. Plus, this modem together with the DSL service will let you talk on the phone while you're online. Of course, these PCs are loaded with tons of other great features, like Intel® Pentium® III processors, thrilling 3D graphics, DVD- or CD-ROM drives, and more — all at an incredible value. So now, your family can e-mail, download, and surf in a whole new way: peacefully.

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6X DVD-ROM Drive[5]	52X True X CD-ROM Drive[4]	52X True X CD-ROM Drive[4]	52X True X CD-ROM Drive[4]
Diamond Viper 550 AGP w/16 MB SDRAM	2X AGP Graphics w/8 MB SDRAM	2X AGP Graphics w/8 MB SDRAM	2X AGP Graphics w/8 MB SDRAM
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56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
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Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]	10 Mbps Ethernet Port, Cable Modem Ready[8]
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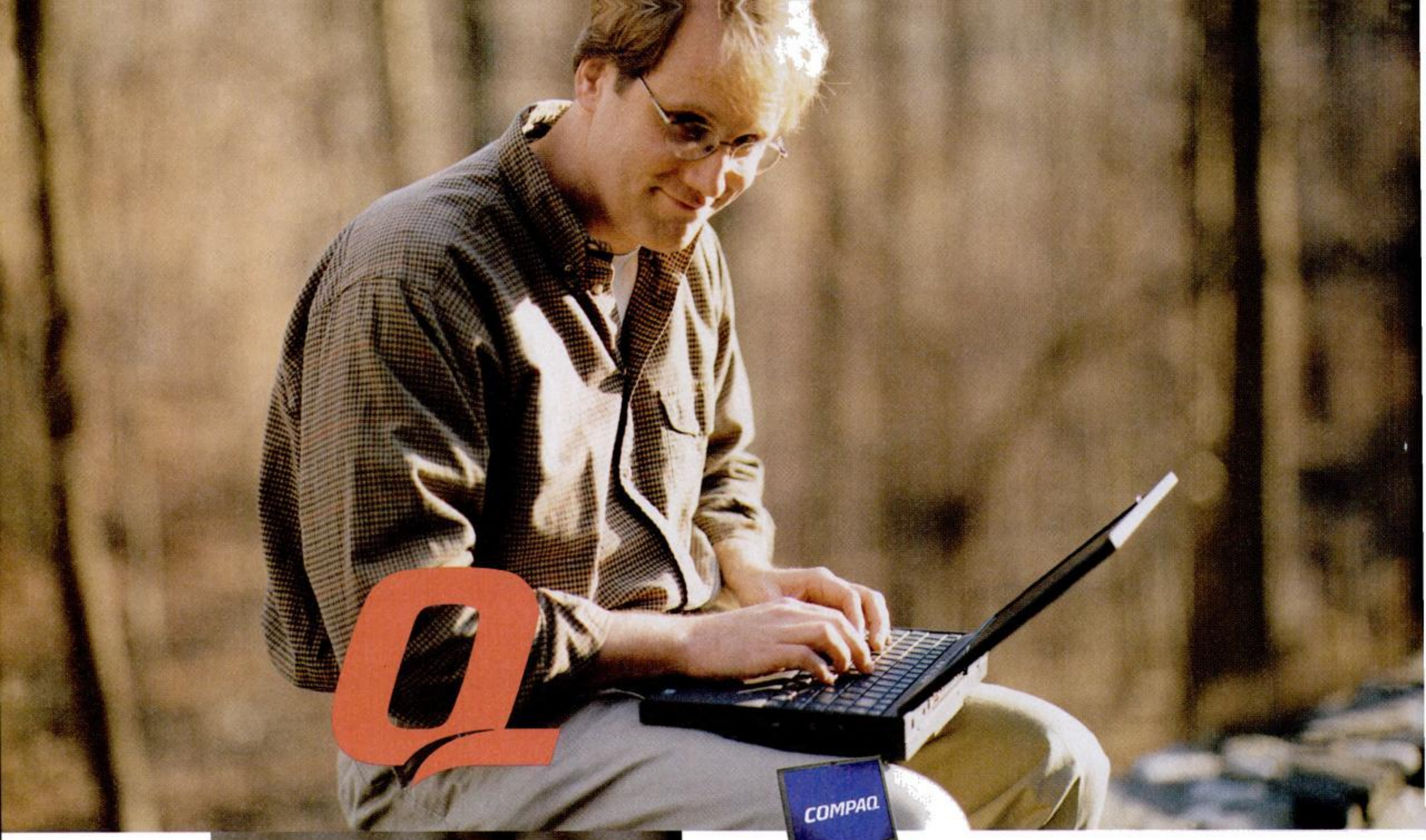

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	PRESARIO 1900-366 INTERNET NOTEBOOK PC	PRESARIO 1900-333 INTERNET NOTEBOOK PC
	Intel® Pentium® II Processor, 366 MHz	Intel Pentium II Processor, 333 MHz
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	64 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM expandable to 192 MB
	10.0 GB UltraDMA Hard Drive[1]	4.0 GB UltraDMA Hard Drive[1]
	2nd-Generation DVD-ROM Drive[4]	2nd-Generation DVD-ROM Drive[4]
	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM
	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
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We created a precision-engineered wedge that contains a DVD-ROM, floppy drive, and port replicator connector. With the wedge on, you've got the ultimate, all-in-one multimedia notebook. Snap off the wedge and you've got a lean, mean, 1.2-inch-thick notebook that weighs in at only 5 lbs. (Which is a good thing when you're sprinting for a plane.) Either way, you'll have a notebook with one-touch Internet access, outrageous graphics, a high-speed modem, and a large, vibrant screen. So get one today. But hurry — they're moving fast.

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4.0 GB UltraDMA Hard Drive[1]	6.4 GB UltraDMA Hard Drive[1]	4.3 GB UltraDMA Hard Drive[1]	4.3 GB UltraDMA Hard Drive[1]
24X Max CD-ROM Drive[3]	24X Max CD-ROM Drive[3]	2nd-Generation DVD-ROM Drive[4]	24X Max CD-ROM Drive[3]
256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
Smart Lilon Battery	Smart Lilon Battery	Smart Lilon Battery	Smart Lilon Battery
256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache
Microsoft Featured Home Collection	Folio Carrying Case	Microsoft Office 97 Small Business Edition	Microsoft Featured Home Collection
Microsoft Windows98	Microsoft Office 97 Small Business Edition	Microsoft Windows98	Microsoft Windows98
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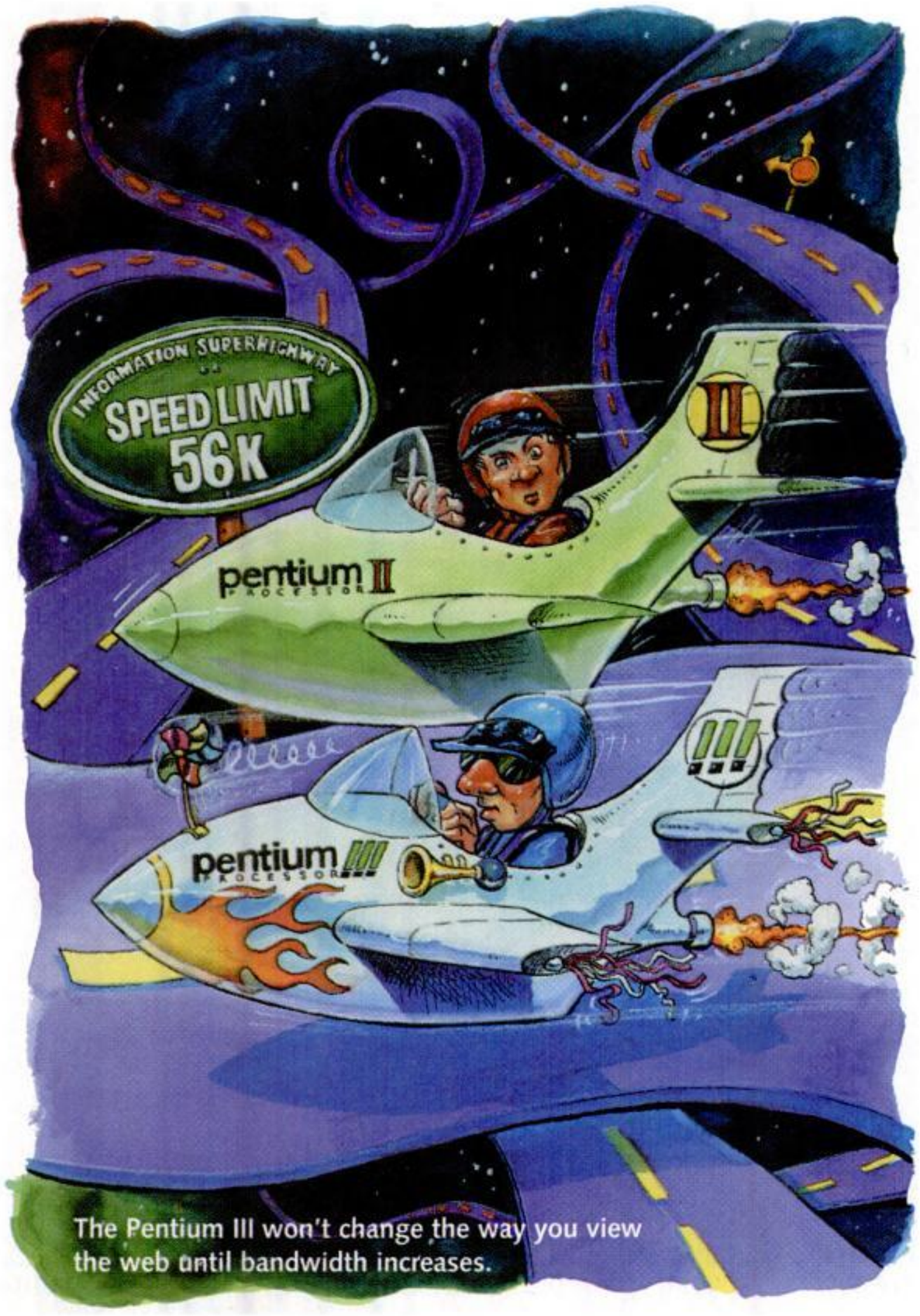
Pentium III myths debunked

Latest Intel CPU speeds past bad press over privacy, performance, and support



The Pentium III won't change the way you view the web until bandwidth increases.

In the court of public opinion, Intel's Pentium III launch has suffered a beat-down. Go to any CPU-related web site, and you'll find the fanatic contingent calling bunk on the new processor. Its Streaming SIMD Extensions don't justify a version leap from II to III, they say. Software developers aren't supporting the new instructions.

Privacy groups, meanwhile, are battering the P-III's Processor Serial Number, saying it can be used to violate privacy. And even rank-and-file consumers are mystified by the Intel ad campaign that states "to really get into [the Internet], you've got to go there with an Intel Pentium III processor." Come again? The P-III is an *Internet* CPU?

Now, at press-time, some seven weeks into the P-III launch, we debunk pop mythology and put the whole "failed launch" bugaboo into perspective.

Charge 1: The new instructions are a yawner. We find Intel innocent. Our own benchmarks (published in March) show the instructions can boost performance by almost 100% in highly optimized games and applications. Meanwhile, many developers are singing SSE's praises, while not a single one has even candidly complained to us that the instructions are impotent or difficult to work with.

Autodesk's Jimmy Giliberti, senior director of product development, says, "We've updated our *3D Studio Max* Heidi interface for SSE and saw a 30% increase in performance. With the way our graphics pipeline is set up, this was an easy one for us."

The merits of SSE as a gaming technology may be best expressed by Keith Diefendorff, a senior analyst at MicroDesign Resources. "SIMD is the right thing to do," he says, "specifically for multimedia performance, which I think is the most important aspect of PC performance going into the future. SSE is as good as Intel could have done within the constraints of the x86 architecture."

Critics who complain that the P-III is just a gussied-up P-II should note that, for the time being, if you're looking for leaps in clock speed, you'll only find them in the new product line, which should hit 600MHz and faster by the end of the year. And perhaps most significantly, Intel hasn't resorted to its typical "gouge-the-consumer" pricing shenanigans with the P-III launch: The initial pricing disparity between the fastest P-II and slowest P-III was much less profound than the initial disparity between the fastest Pentium MMX and slowest P-II when the P-II first hit shelves.

Charge 2: Developer support is bad. We again find Intel innocent. What constitutes

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SPIN CYCLE

This month's top stories broken down ►

HEADLINE	NEWS	DETAILS	QUOTE	OUR TAKE
HDTV May Come to PC First	Get ready for high-definition TV tuners on your PC. TeraLogic recently demo'd a reference design card using the company's Janus DTVPC decoder chip.	Going for as high as $10,000 per set, High Definition TV sets aren't setting the world on fire, but add a card to a PC and you may get HDTV for as little as $300.	"Low-cost HDTV-on-PC solutions will raise tremendous awareness and interest for the overall market," said Peng Ang, CEO and chairman of TeraLogic.	You'll need a 2000x1200 resolution monitor to get the full range of HDTV, but it's still better than $10,000+ for a HDTV television.
Intel Doesn't Block P-III Overclocking... Yet	Intel says its attempt to curb "remarking" has precluded a need to lock CPU speeds down for now. Move those Pentium III's a bin up if you want.	Intel's frequency ID tells consumers what CPU they have. However, Intel says it still plans to prevent overclocking down the road to help it fight chip counterfeiting.	"We want people to know the programs are targeted at re-markers not hobbyists," said Intel's Craig Johnson.	Three cheers for the détente in anti-overclocking. The real problem lies in re-markers.

For definitions of Terminator words, hyperlink to the back of Maximum PC, or check out the Terminator online at www.maximumpcmag.com.

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"good" support is open to interpretation, but from where we stand, Intel has accrued both quantity and quality. George Alfs, Intel's Pentium III program manager, says the company showcased 240 SSE-optimized apps, games, tools, and web sites at a February preview day. Alfs says 160 titles are currently available (and this number doesn't include DirectX 6.1 games, which merely leverage driver optimizations). In comparison, some seven weeks into the MMX launch, only about 20 titles were MMX-optimized.

"We've updated our 3D Studio Max Heidi interface for SSE and saw a 30% increase in performance."
—Jimmy Giliberti, Autodesk

Alfs says that by the end of the year more than 500 software titles and web sites will be SSE-optimized—roughly 340 consumer, the rest business. Sadly, only a fraction of Intel's purported titles are mentioned on Intel's web site, and no other resource has a more comprehensive list. Hence, SSE developer support has become a public guessing game. If Intel doesn't hit 500 titles by 2000, we'll be the first to call bunk.

For now, the quality of publicly announced SSE titles is impressive. Big name productivity apps such as Adobe *Photoshop*, Equilibrium *DeBabelizer Pro*, and Macromedia *Director* are onboard—the kind of apps that can consume 90% of a professional's computer usage. Microsoft, meanwhile, has announced SSE support for *Office 2000*, various DirectX APIs, and even the Windows 2000 operating system itself. On the gaming tip, you can look forward to A-titles such as *Quake III Arena*, *Descent III*, and *Unreal Tournament*.

Much SSE skepticism might be residue from the fruitless MMX launch. But all observers report that Intel has offered much more coddling this time around, getting compilers ready, sending out development systems, and getting apps lined up and in place. "Intel had a full multimedia presentation for each individual instruction," says Equilibrium marketing manager David Gartner. "Our developers could visualize exactly what each instruction did, and it made it very easy for us to optimize our current code for SSE caching."

Charge 3: The Processor Serial Number controversy has given the P-III a black eye. We find Intel guilty—but most consumers are voting "not guilty" with their pocketbooks.

Sure, privacy advocates have accused Intel of hard-coding a serial number that could eventually be used for collecting data about private individuals. But the outcry has tended to ignore the fact that no one has yet been violated by Intel's serial number, and online privacy is already a guessing game, given potential breaches via browser cookies, the Windows 98 registration process, and *Office 97* document sharing. No, the real problem is that the Processor Serial Number isn't an effective identity verification technology, its intended raison d'être.

"Intel's justifications for Processor Serial Number aren't very compelling," says Diefendorff. "It is not a very effective Internet security feature… An ID should be tied to the individual, and not a particular machine."

Apparently, the privacy controversy hasn't scared off consumers. System OEMs have told us they've seen increased sales for their high-end performance PCs. "Traditionally, and without any deviation this time, we see a spike on the high-end when Intel announces new processors," says Dell Public Relations Manager Bill Robbins.

Charge 4: The P-III doesn't do jack for the Internet experience. Right here, right now? Guilty as charged. The cynical explanation behind Intel's ad campaign is that the company is riding the wave of Internet mania by arbitrarily calling the P-III an Internet processor at the 11th hour. After all, the pre-launch hype focused on gaming, multimedia production, and speech recognition.

Intel explains the ad campaign by saying you can enhance your Internet experience by downloading SSE-optimized browser plug-ins that process better-than-ever multimedia content—streaming sound and video, 3D walk-throughs, complex vector animations, that sort of thing. But while the plug-ins may play impressive material, they're still plug-ins: You must download them yourself before enjoying the optimized content, and history has shown that many consumers just plain hate the hassle.

More importantly, content developers must actually take the time to build SSE-optimized content—under the assumption that enough consumers own P-IIIs and have installed the appropriate plug-in software. The result, we fear, is that SSE content will represent a few parts-per-million of the entire Internet content ocean for the foreseeable future. Hardly a compelling reason to rush out and buy a P-III.

The real issue is bandwidth, but as Intel's Alfs says, "We're doing everything we can to make the net a better place without bandwidth."

Call us cynical, but we'll take 1.5Mbps throughput to an "interactive" Dawson's Creek desktop any day. ✹

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to the pertinent details.

26

HEADLINE	NEWS	DETAILS	QUOTE	OUR TAKE
Microsoft Offers Alternative to MP3 Internet Music	Microsoft splashed into the hot Internet music scene with a new standard dubbed Windows Media 4.0.	Windows Media 4.0 lets people listen to Internet music that's "MP3 quality" while offering copyright protection to prevent people from pirating music.	"Windows Media Technologies 4.0 represents clear and tangible innovation for the consumer experience," said Microsoft vice president Jim Allchin.	Right. Never one to pass up a revenue stream, Microsoft is pushing a format that seems to be proprietary to Windows.
RAMBUS Shortage Throws Chipset Launches in Question	Asian chip makers say that very little high-bandwidth RAMBUS memory will ship this year—and new chipsets from Intel and AMD are locked into a RAMBUS future.	The industry was anticipating Intel's 133MHz-system-bus chipset in July. It's now slated for late Q3/early Q4. AMD says its 200MHz chipset is "on-track."	"Whether the K7 bus is 200, 150, or 100MHz, it's not a big deal in the performance desktop market," said MicroDesign Resources analyst Keith Diefendorff.	Regardless of whether home consumers need a 200MHz bus, AMD will catch hell from users if the K7 doesn't launch according to its well-publicized specs.

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trends ► e-commerce

Online shopping laden with potholes

Consumers beta testers in e-commerce economy

E-commerce firms such as Buy.Com have experienced major glitches, including mispriced products and greater than anticipated demand.

A 19-inch monitor for $165? How about 400 blank CD-R discs for $110? If you tried to purchase either of these products from online "super store" Buy.Com recently, you'd be lucky if you actually received them.

Both prices appeared as glitches on the company's BuyComp.Com web site in recent months. Although 1,400 people ordered and were charged for the monitor, Buy.Com had to cancel all but 124 orders. And those who piled onto the killer deal on CD-Rs got the shaft.

Browse through *Maximum PC*'s past few Watchdog columns and you'll find many a dissatisfied customer. From Shopping.Com—with new capital from Compaq Computer—to small shops such as BZBoyz.com, it's easy to see online buying isn't as sedentary as shopping at the mall.

"Entrepreneurs are stretching themselves far beyond their means."
—Scott Smith, Teragroup

"There's a tremendous opportunity for mismanagement," says Scott Smith, owner of e-business research firm Teragroup. "The hype and the pressure has built to such a tremendous level that entrepreneurs are stretching themselves far beyond their means."

The serious question the online shopping industry faces going forward is the disconnect between consumers' expectations of online shopping and what they're actually getting.

"People expecting perfect customer service, perfect delivery time frames, and accurate stock are expecting too much of the medium right now," Smith says. Because online commerce stores rely heavily on distributors being able to deliver merchandise, they're jammed up when the system breaks down or suppliers can't deliver.

And it can happen quite easily. Buy.Com's official excuse for the monitor snafu was human error. Someone keyed in the wrong price in the database. On the CD-Rs, Buy.Com blamed its supplier, Ingram Micro, for quoting the wrong price. In another goof-up recently, more than 15,000 orders for 300MHz Celeron CPUs were cancelled after Buy.Com realized Intel had cut the CPU from its lineup.

Although three times as many consumers logged in to buy $3.14 billion in products for Christmas 1998 compared to 1997, the number of satisfied customers dropped to 74% from 88% the previous year, according to research firm Jupiter Communications .

There are consequences. Buy.Com was slapped with a class-action lawsuit soon after the monitor fiasco. Southern California attorney Gary Sodikoff says one of his concerns is that Buy.Com's stated goal is to make money off advertisements, not selling products.

Some firms have other motives, Teragroup's Smith says. "Some are not in it to serve the public. They're in it to build a name, grab the IPO and get out. I think a fair number are [thinking short term]."

Still, none of this means online shopping will suddenly fall out of fad. Like most analysts, Smith expects e-shopping to increase with the next boom in business-to-business. And for every bad execution of online shopping, there's one doing it right, Smith said.

"I think the public at large is intrigued enough by the medium that their interests helps make up for some of the burns in customer service," Smith said. "If I have a bad experience [shopping online] I just go somewhere else."

SPIN CYCLE

◀ 25

HEADLINE	NEWS	DETAILS	QUOTE	OUR TAKE
Famous Hacker Pleads Guilty	Kevin Mitnick, the hacker who admitted to causing millions of dollars in damage, pleaded guilty to five felony counts in U.S. District Court.	Under the deal, Mitnick received a prison sentence of three years and ten months, with credit for time served. He could be a free man by the middle of next year.	"If he doesn't behave, he'll be in longer," said David Schindler, a federal prosecutor.	Despite the plea, Mitnick won't be allowed computer access for a period of at least three years. In our eyes, this is a fate worse than death.
Linux Picks Up Steam	Linux, the free and open OS, continues to pick up velocity with PC vendors.	Dell, IBM, Compaq, and SGI have embraced Linux while Caldera plans to release a consumer friendly version. Linux's appeal is its price and free source code.	"Microsoft isn't interested in anyone fixing bugs—they're interested in making money," said Linus Torvalds.	Competition in the OS space is good for consumers. A "user-friendly" Linux helps keep everyone on their toes.

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Studio MP10 lets you create video for CD, the Internet or multimedia presentations

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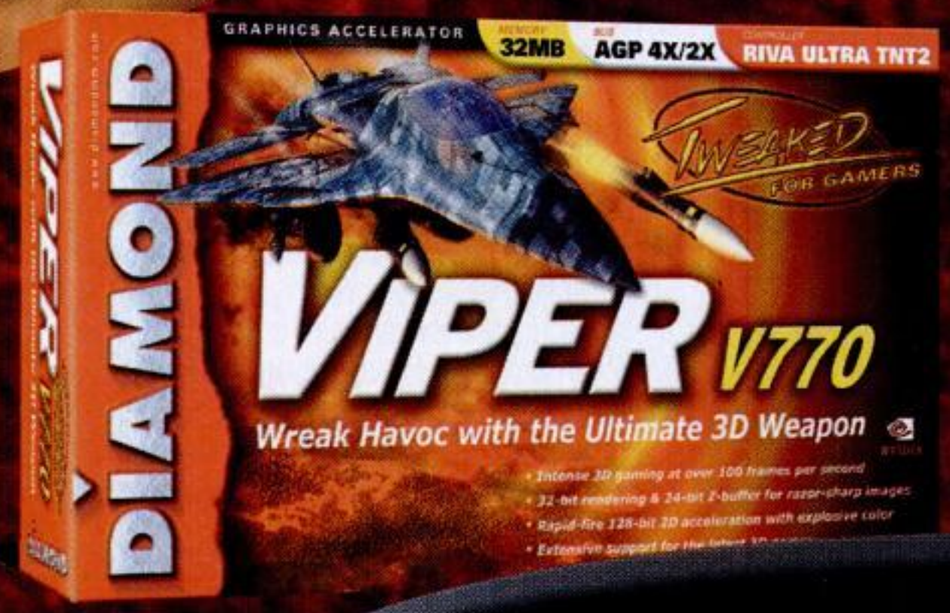

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▶ Maximum PC takes a bite out of bad service and gear

WATCHDOG

THIS MONTH

▶ Driver Responsibility

▶ Diamond Talks Service

▶ Computer Shack Refunds!

ILLOGITECH

DEAR DOG If software is required for full functionality with a piece of hardware, should the end user have to pay for an upgrade?

A few months back, I purchased a **LOGITECH** Trackman Marble that came with Mouseware 7.20, which is required to use the middle button. Just last month I upgraded to a Win98 system and went on the web to get new drivers, but the drivers information page stated:

Logitech Trackman Marble

"Please note that Mouseware versions 7.5 and higher are the only full releases of Mouseware that are supported under Win98. Using Mouseware 7.2x or below under Win98 is not recommended. Please note that Mouseware 8.x is available for purchase via Logitech Sales."

It is absurd that I have to pay for a software upgrade to use Logitech's hardware. Diamond Multimedia doesn't charge me for an upgrade of its InControl Tools 98. Iomega didn't charge me for upgrades to Zip Tools for Win98 compatibility. What's up, Logitech?

—Peter Chu

THE DOG We contacted Logitech officials for their view of the driver situation. Their response?

"The reasons for charging customers a ten-dollar shipping and handling fee are as follows:

▶ "The customer pays for an upgrade for their operating system. This upgrade is not free and the manufacturer (Microsoft) is benefiting financially from this. Logitech does not make any money when the customer upgrades their OS. It is reasonable to assume that when a customer chooses to upgrade their OS, they must consider how their existing hardware and software will function under a new OS. Part of upgrading their OS may include having to upgrade other software or hardware previously installed.

▶ "This is not an "upgrade" that Logitech makes money on. The minimal $10 charge is merely to cover the costs of disk duplication, handling, and shipping.

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Watchdog letters are posted regularly online.

▶ "Any Logitech product purchased comes with software for the current supported operating systems. On the box are stated the operating systems supported by the hardware and the software. If a customer chooses to change their operating system, they are then using a product outside of the current system requirements.

▶ "With the posted drivers, our products function as three button mice/trackballs and the user is able to set the middle button to double click (the most common request) without upgrading the software. In effect, all components that are necessary for functionality are provided free of charge.

"We understand that it can be frustrating to customers to have to pay for anything after upgrading their operating system, but we think it is unfair to ask Logitech to incur the costs for their decision."

How long should a company support its product? THE DOG's been told by some companies that as long as the product is current they'd support it. What do you think? Does it really cost companies anything to make the latest drivers available on the web? It's been a hot topic here in the Maximum PC offices. Some companies, such as HP's scanner division, don't provide driver updates for the transition from Windows 95 to 98.

COMTRADE IN THE HOUSE

DEAR DOG In September 1998, I purchased a **COMTRADE** PC because of the good prices and positive reviews. I immediately started experiencing odd intermittent problems such as crashing, rebooting, and the hard drive going corrupt, wiping out everything. I tried to contact tech support over the web several times, but never received a response despite a promise of 24-hour response. I began calling. Meanwhile, I figured out the problem came from the PCI slots being loose. Over time, the cards would vibrate out even when screwed in. Weeks went by before I got a response to my phone calls, and that was only after I reached the sales line. A technician told he me would send a replacement motherboard. The charge for the motherboard showed up on my credit card, but the board never arrived.

COMTRADE

"I immediately started experiencing odd intermittent problems such as crashing, rebooting, and the hard drive going corrupt."

On February 6, I finally reached a Tech Support individual who gave me an RMA number and told me to send the system in. They returned my "repaired" computer, but it continues to crash. Comtrade promised to send a replacement DIMM for one module that went bad as well, but, you guessed it, it never arrived. I've never been able

ILLUSTRATION BY SCOTT LAUMANN

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to reach the manager or owner to complain about this problem and the receptionist refuses to take messages for customer service!

—Larry Lindenbaum, MD

This isn't the first complaint about Comtrade we've received. So, THE DOG phoned Comtrade, several times, to get the company's view of things, but never made contact. Even after the Dog left messages clearly saying that all we wanted was their side, Comtrade brushed the Dog off. What can the Dog do but put Comtrade in the Dog House. Consider the company off limits and a bad investment of your PC shopping money. Aroof. Bite 'em where it hurts: in the wallet.

READERS BITE BACK

Readers were skeptical of the answers given by Iomega's Ted Brisco in the Dog's March column.

DEAR DOG Brisco obviously doesn't know what the hell is going on. I bought a PC with a Zip drive that wouldn't save more than 31.4MB on a disk. When I called Iomega, I got that BS recording telling me that I needed to get my credit card ready. I was ready for battle with whomever I would eventually speak. Fortunately, I was not asked for a credit card, *yet*! I was given an incident number and passed to a tech that walked me through many of the things that I had already done, only to tell me that the unit would need to be replaced. A few days later I received a refurbished replacement drive and nothing else, not a driver or directions—just some bubble pack. After installing it and formatting a disk, I tried to save a large file to the Zip only to get a click, click, click. My second go 'round, I explained to them that I expected a new drive this time, and they agreed. All I can say is it is a good thing Iomega is so far away.

—Bruce

Zip Drive

DIAMOND SERVICE

The Watchdog slipped a few questions into an interview with Diamond Multimedia's Vice President, Scott Voorhees, this month. Flip to page 42 for the full interview.

MAXIMUM PC Our Watchdog has received a lot of complaints about Diamond's return policies and customer service. What are some of the areas that Diamond is targeting in 1999 in terms of customer service?

VOORHEES We've had some major programs underway in the past three months that target our technical-support response time. We had a system that when you e-mailed technical support you got an automated response that asked you to fill out a standard form to get the necessary details so it would be easy to track down the answer, but it ended up making people feel like they weren't getting personal attention, and there were MIS issues. So that's one area.

Getting a human being with a correct answer in a much shorter time frame has been a major focus for us. Another area was in the number of telephone calls that we handled successfully per day.

The third is with our rebates. There has been some controversy about our rebates. We certainly have never intended that to be any kind of a scam. That is an honest effort to provide value to the end user. Unfortunately, when the infrastructure breaks down, people think that there is something nefarious about it. It's not that; it's strictly administrative and bureaucratic difficulties. So that's the third area where we put a lot of effort in fixing the fulfillment issue and trying to clean up our image.

"We never intended that to be any kind of a scam. That is an honest effort to provide value to the end user."

MAXIMUM PC You said you want to improve response time. To you, what would be a good response time?

VOORHEES 24 hours.

MAXIMUM PC Will some of those complaints be handled by a real person or will it all be done via e-mail? Or a combination of both?

VOORHEES It's a combination of both, depending upon how much detail we can get. ✹

Got a bone to pick with a vendor? Get spiked by a fly-by-night operation? Sic the dog on them by writing watchdog@maximumpc.com. The dog promises to get to as many as possible, but only has four paws to work with.

DOG UPDATES ▶

WHATEVER HAPPENED TO...

COMPUTER SLACK UPDATE

Remember **COMPUTER SHACK**, the "discount club" that couldn't refund its customers? (For the full skinny, see the news section of the December 1999 issue.)

The owners of the company have settled a civil suit filed by the Arizona Attorney General's Office and agreed to refund monies to customers. The AG's office fingered Vincent Passfiume, Michael Consoli, and Geraldine Consoli as the primary operators of Computer Shack, Insider's Computer World, and Insider's Audio.

"The three acknowledged that their claims were false, that they misrepresented manufacturers' warranties, that they failed to refund customers' money when asked to do so, and that they made unauthorized charges to customers' credit cards. The defendants also admitted that they operated their discount buying club without getting the necessary registration and bond required by Arizona law," according to the AG's office. Whew.

The three will refund membership fees to all individuals who file complaints with the Arizona BBB, the Postal Inspector's Office, or the Attorney General's Office.

If you've been bitten by Computer Shack, you should file a complaint with the Arizona Attorney General's Office. Call 800-352-8431, or to file a written complaint with the Postal Inspectors, write to P.O. Box 20666, Phoenix, AZ 85036-0666. ✹

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THE Computer PAGE.

Special F/X

MICROSOFT® PHOTODRAW™ 2000 BY DESIGN

by William Tait

Create and edit graphics using Microsoft's new imaging and graphics program, PhotoDraw. This hands-on project book and comprehensive feature guide takes readers step by step through the tools, menus, wizards and other functions available through this innovative drawing program. The CD-ROM contains original artwork by the author and a demo version of PhotoDraw. (Microsoft Press)

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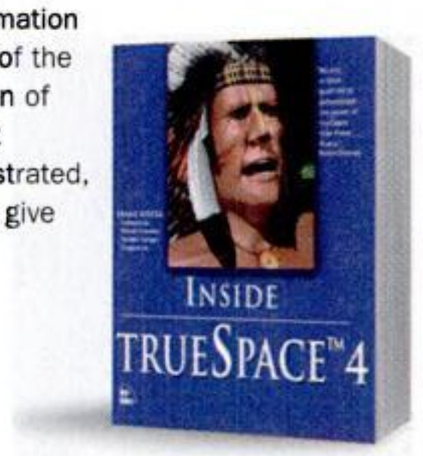
by Frank Rivera

Professionals in the 3-D graphics and animation fields will benefit from this hands-on tour of the new features available in the latest version of TrueSpace. *Inside TrueSpace 4* is not just another manual, it is a thorough, fully illustrated, step-by-step production guide designed to give you the edge in a competitive industry. (New Riders)



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by Steven E. Callihan

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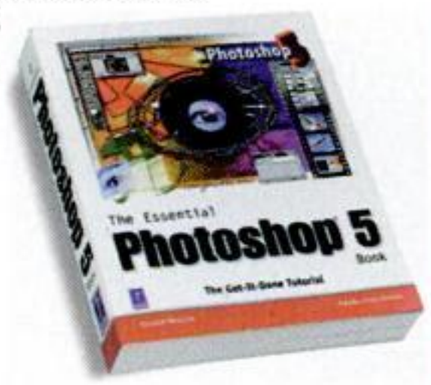
by Eileen Mullin

This revision of the popular first edition provides updated information on retouching photos, adding textures and shadows, creating an indexed color palette, building clipping paths, designing images for use on the Web, and more. Whether you are upgrading or are a newcomer to computer graphic design, this task-specific tutorial guide is a must. (Prima Tech)



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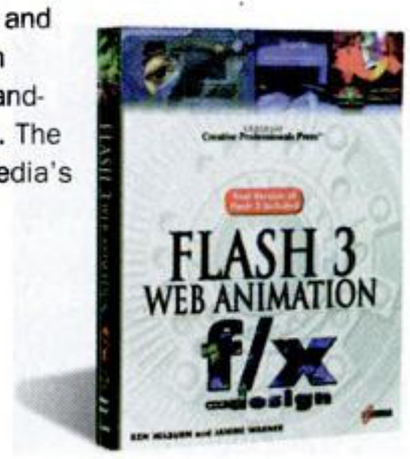
FLASH 3 WEB ANIMATION F/X AND DESIGN

by Ken Milburn and Janine Warner

Create interactive Web pages, morph shapes, fade objects in and out, import and synchronize sound, and perform many other special Web animation effects when you master Flash 3—the up-and-coming animation design tool of the future. The CD-ROM contains trial versions of Macromedia's Flash 3, Dreamweaver 1 and more. (Coriolis)



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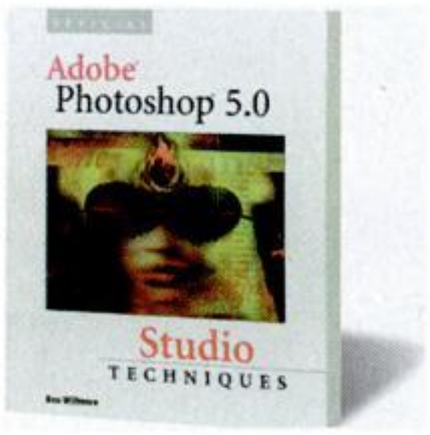
by Ben Willmore

An invaluable handbook that goes beyond conventional step-by-step instruction, providing the kind of insight and information that will help you truly understand and appreciate Photoshop. It leads you through the techniques, and helps you learn even the most complex features, the individual steps and their effect on your imagery. (Adobe Press)



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Lexar 8x Card

When you outgrow the cozy CompactFlash card that came with your digital camera, move up into the spacious confines of Lexar's new $329 80MB model, which holds some 200+ "Best"-quality images from the Kodak DC265. With this sort of volume, CompactFlash should drive the nail into the coffin of lagging SmartMedia. And this extended legroom comes with all the benefits of Lexar's performance-driven approach, which cranks this card to 8x speeds to minimize lag between shots. **Lexar; www.lexar-media.com; 800.789.9418**

Kodak DC265

How do you take a perfect 10/Kick Ass digital camera and make it even better? That's the dilemma faced by Kodak and the DC265 is the photography legend's response. In addition to a sharp 1.6-megapixel CCD, 3X optical zoom, and external flash sync, the DC265 adds buffer memory for faster boot times and shot-to-shot processing (up to 24 frames in standard-res burst mode). For times when "Best" image quality isn't enough, Kodak adds an even finer "Super" mode, accessible through the camera's scripting language. And the 8MB CompactFlash card has been upgraded to 16MB.

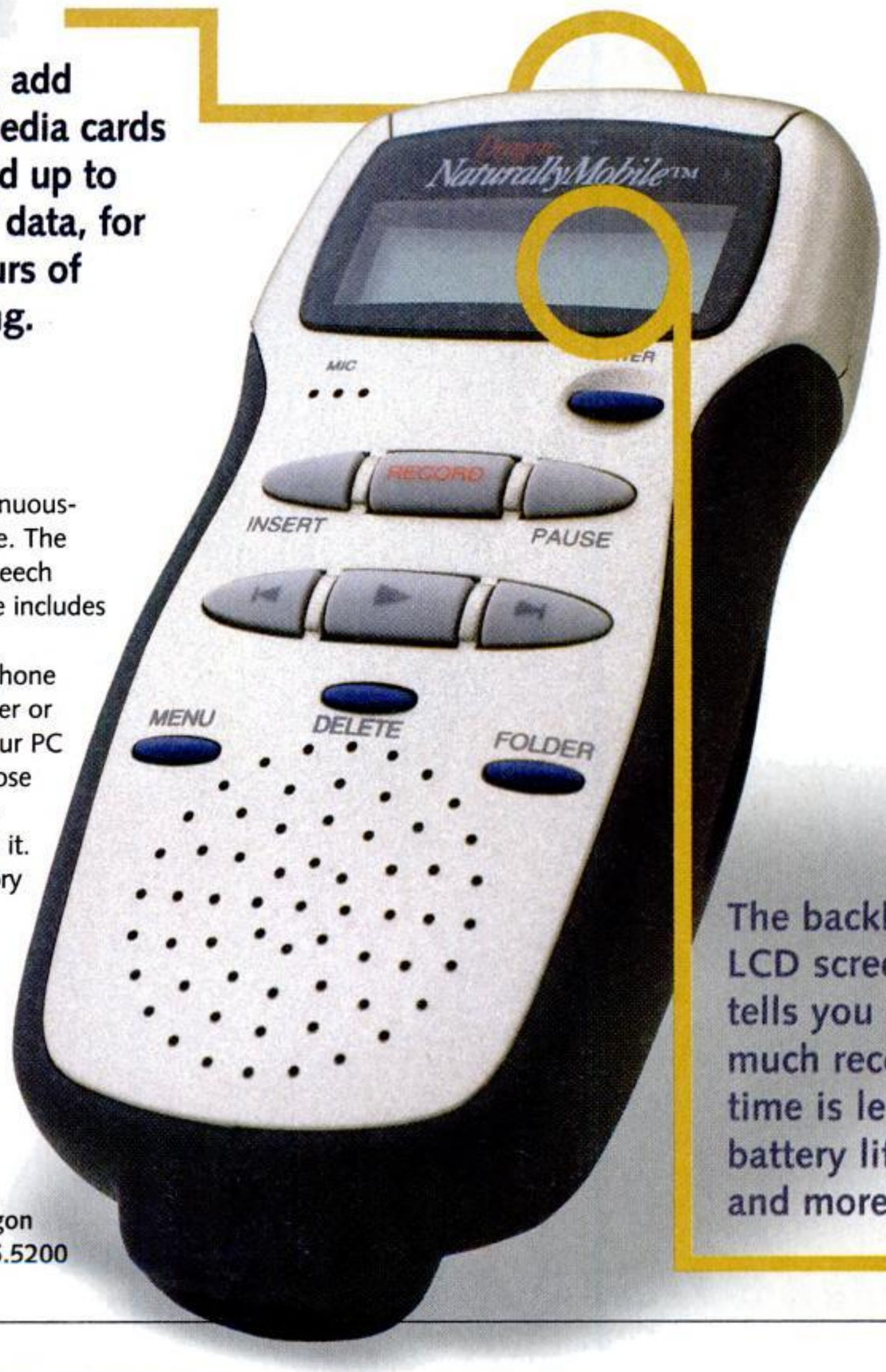
With digital cameras, power is always a concern, and the DC265 adds improved power-management software and four rechargeable Ni-MH batteries with charger. All this comes with the same $999 price tag, proving the best can get better. **Kodak; www.kodak.com; 800.235.6325**

You can add SmartMedia cards that hold up to 8MB of data, for two hours of recording.

Dragon Naturally Speaking Mobile

Dragon Systems, the folks with the great continuous-speech-recognition software, have gone mobile. The first digital recorder designed specifically for speech recognition, the $299 NaturallyMobile package includes a hand-held recorder, a full version of Dragon *NaturallySpeaking Preferred*, a headset microphone for better-quality recording through the recorder or your PC, and a cable to connect the unit to your PC for downloading voice files. Oddly, Dragon chose to use a USB port in the recorder, though only the included USB-to-serial cable will work with it.

The 4oz. recorder has 4MB of internal memory that holds up to 40 minutes (approximately 10 pages) of recorded speech; additional memory can be had using 2, 4, or 8MB 3.3-volt SmartMedia. You can store up to 99 time- and date-stamped voice files by several different users, and organize, find, play back, add, or delete information. After downloading recorded speech files, *NaturallySpeaking* and *Voice It Link* software convert them to text and execute formatting and editing commands. Dragon **Systems; www.naturallyspeaking.com; 617.965.5200**



The backlit LCD screen tells you how much recording time is left, battery life, and more.

StudioMix Digital Recording Station

This $899 hardware- and software-based recording studio in a box records up to 256 tracks of MIDI or Digital Audio, plays back up to eight audio tracks simultaneously, syncs audio with digital video, and processes DirectX audio effects in realtime.

The setup includes *Cakewalk Professional 8* and an external Peavey eight-track mixer that can be controlled manually or via software. Ports include XLR mic in, RCA in, tape in/out, soundcard in/out, and MIDI in, out, and through. Targeted at the weekend musician, StudioMix may disappoint professionals with its lack of balanced inputs and USB connections. And although you can simultaneously mix eight separate tracks with the StudioMix, you can't record eight tracks at once, since there aren't enough inputs. To become a hardcore mixmaster, you'll need a dedicated multitrack-capable soundcard, such as Guillemot's Maxi Studio ISIS. **Cakewalk/Peavey; www.cakewalk.com; 888-225-3925**

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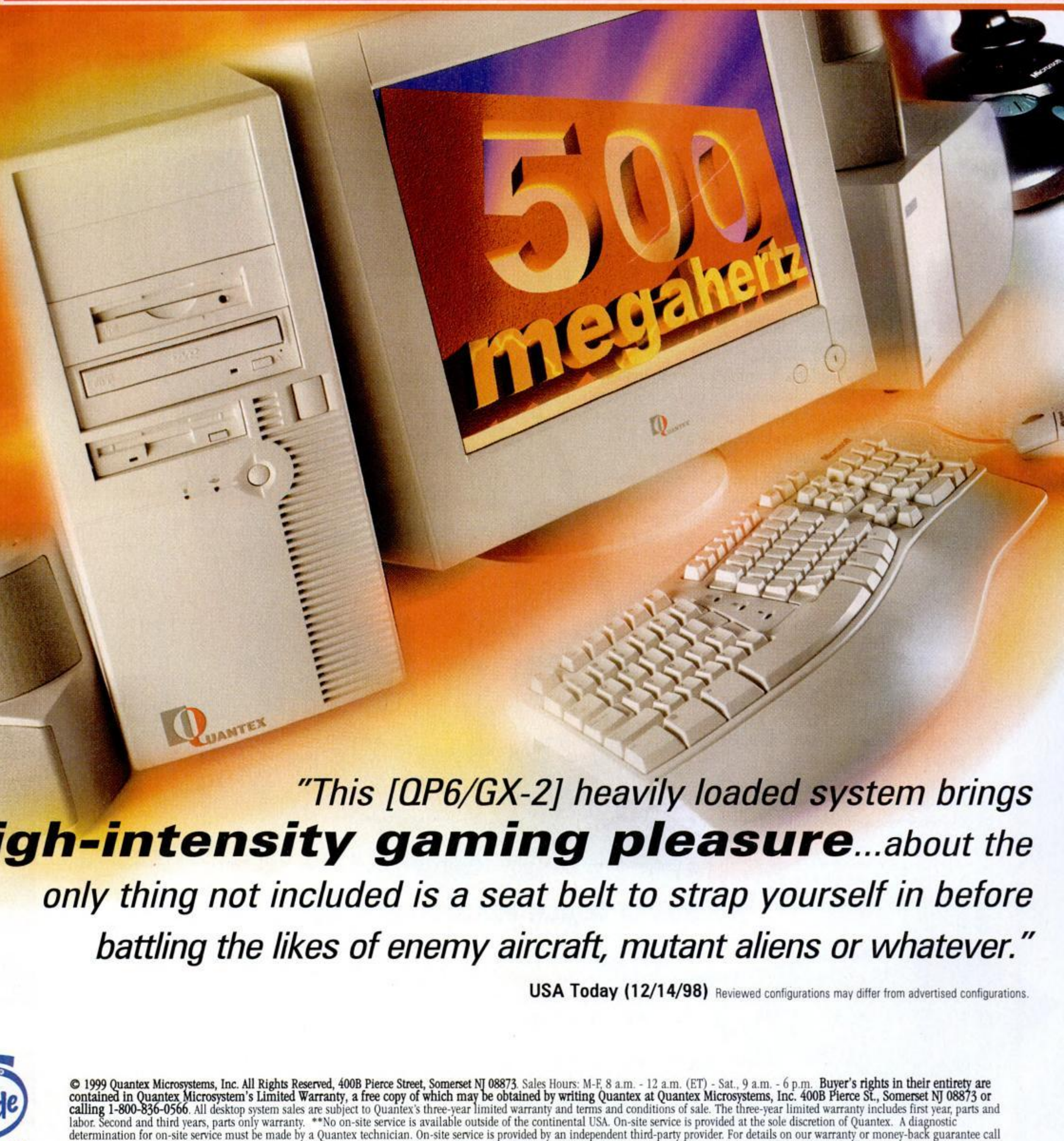

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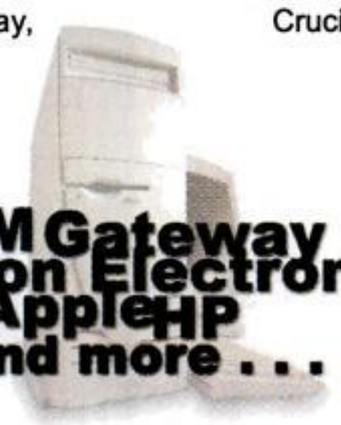

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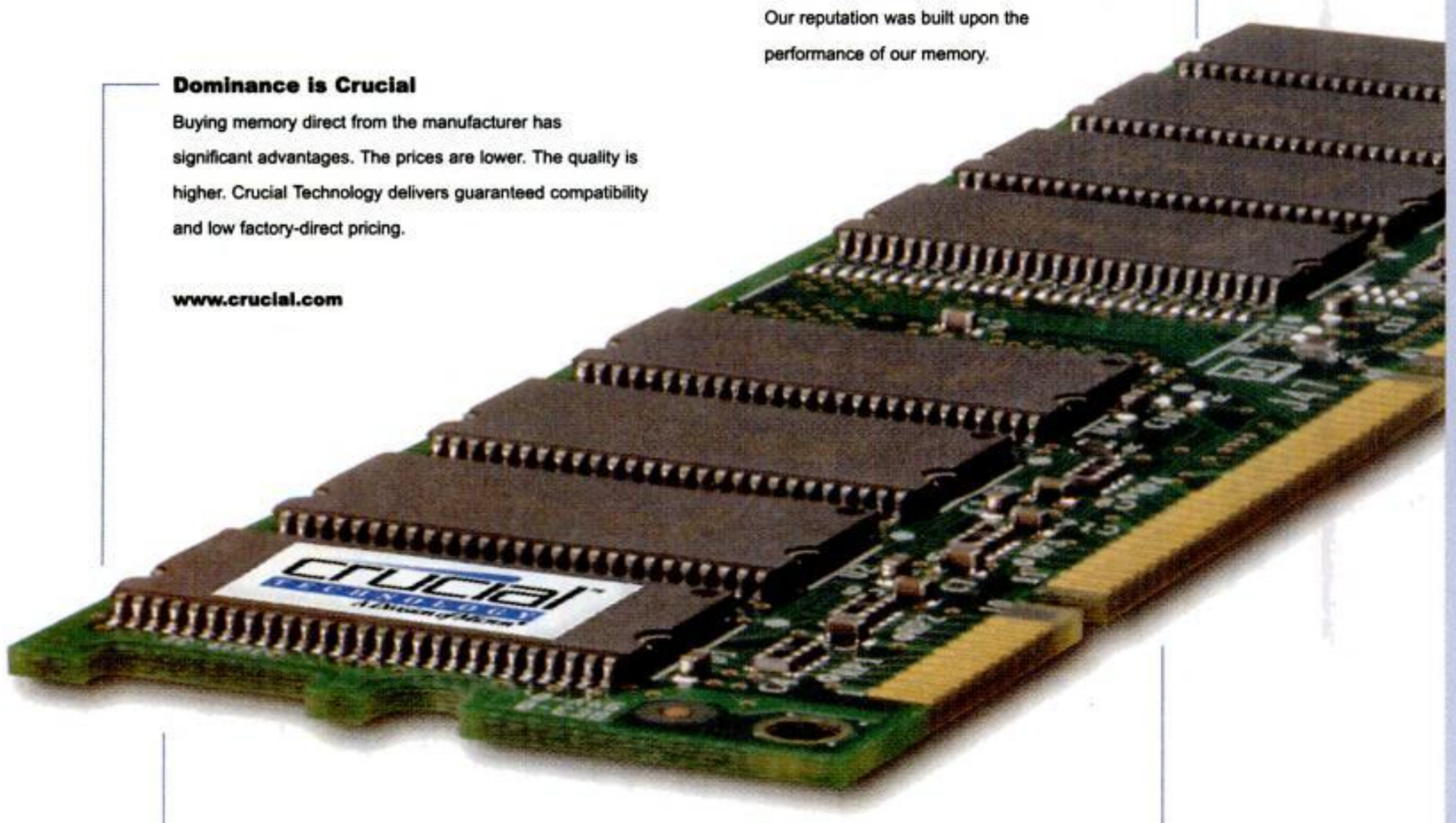

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Powerstation P133 with 54Si BIOS	163.38	NA
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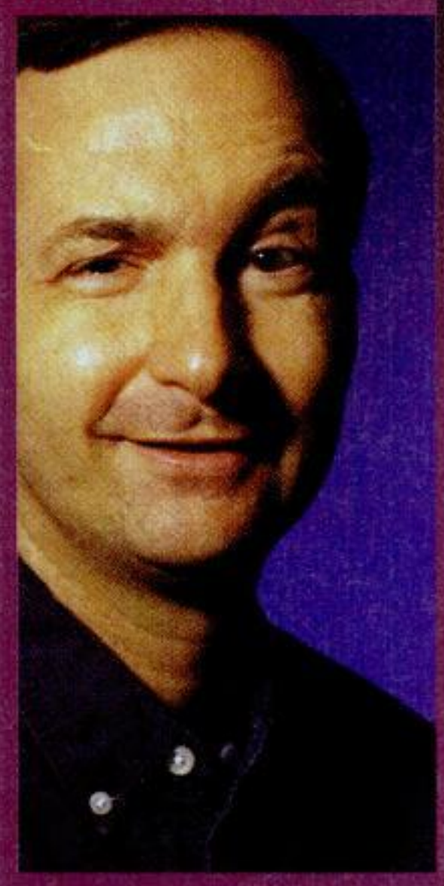

TOM HALFHILL
was senior editor at Byte magazine and is regarded as one of the most knowledgeable experts on processor technology in the industry. Contact him at **thalfhill@maximumpc.com**.

Menace of the Electronic Hearth

OH DARN! THE TOASTER JUST CRASHED... IT MUST NEED NEW DRIVERS.

Welcome to the next frontier: home networking. If you think the pioneers of the Old West had a tough time struggling against the natives, the elements, smallpox, and bad guys, wait until you wrestle with TCP/IP configurations, packet storms, network-borne viruses, and disreputable vendors with neglectful customer service.

OK, maybe you've already been wrestling with those kinds of problems, even without a home network. But I have a feeling that home networking isn't going to be the high-tech wonderland it's made out to be. At least not for a while.

There's an industry-wide push to bring local-area networks (LANs) into homes right now, and I see three reasons. To begin with, it's been a longtime fantasy of high-tech dreamers. "The Jetsons" popularized the concept in the 1960s. When personal computers appeared in the 1970s, experts predicted that home networks were just around the corner. Daddy's computer would communicate with little Johnny's computer, and PCs might control everything from the household heating and cooling systems to kitchen appliances. So vivid was this vision that some PCs of that era, such as the Ohio Scientific Challenger C2-4P, even had an optional line of sensors, controllers, and software for that purpose.

The other two reasons the dream of home networking is enjoying a revival are more down to earth: the overwhelming success of LANs in the workplace, and good old-fashioned greed. Today, LANs are almost universal at large- and medium-sized companies. Many small businesses have networks, too, even if it's just a simple peer-to-peer setup. The advantages of sharing expensive resources—such as fast printers and live Internet connections—are well proven. Now all the computer industry has to do is extend that success into the home.

That's where greed comes in. Home LANs represent a lucrative opportunity to sell new hardware and software, whether people really need the stuff or not. Also, adding intelligence to mundane home appliances will boost the market for microcontrollers, memory chips, and embedded software. Do you smell a conspiracy?

Actually, it's not that bad. In fact, home LANs could save you money. Why buy a printer and a modem for every PC in the household if all the machines can share those resources over a network? Indeed, why purchase multiple PCs if some family members can get by with a simpler computing device that uses the main PC as a server? Don't laugh. Someday your children might be browsing the web and sending e-mail on a $150 videogame console that shares a networked cable modem with your PC, stores MP3 files on a partition of your hard disk, and prints pictures of teen heartthrobs on your printer.

To make this happen, though, home networking has to get a lot easier than office networking. Businesses have MIS departments to install and maintain the equipment. That model doesn't apply to the average home, where family members squabble over control of the TV remote control and whose turn it is to wash the dishes. Can you imagine arguing over who has to assign IP addresses and whose turn it is to defrag the server's RAID drives?

The first obstacle is what network geeks call the "physical infrastructure." Nobody wants to drill holes in their walls to pull Category 5 cabling through conduits. Fortunately, the industry is working on solutions that piggyback network traffic on existing telephone lines, cable TV coax, electrical wiring, and wireless signals.

But the foolproof integration of the technology worries me. We're talking about an industry that still expects clueless consumers to open up their PC cases and handle easily damaged chips to install memory. We're talking about an industry that still requires people to fiddle with jumper settings and DIP switches when configuring new peripherals. We're talking about a supposedly innovative industry that still mires us in the swamps of BIOS settings, software conflicts, and day-long operating-system upgrades. The last thing we need is to spread this madness beyond our PCs to the rest of our home. I don't want to be downloading new device drivers for my toaster.

The two most interesting proposed solutions are Microsoft's Universal Plug-and-Play (UPnP) and Sun's Jini. Covering these technologies in detail is a subject for a future column, but it's enough to know that both want to make resource-sharing over networks ubiquitous, automatic, and as trouble-free as possible. Both appear to be technically sound, although both are in the early stages of formation.

My guess is that except for the hardy pioneers who are willing to struggle with today's clumsy networking technology, true plug-and-play home LANs are still about five years away.

That's where greed comes in. Home LANs represent a lucrative opportunity to sell new hardware and software, whether people really need the stuff or not.

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SHEL KIMEN
has worked in the industry, traveled the world, and covered the Internet for both The Net and boot magazine. She can be contacted at **skimen@maximumpc.com.**

If the Chat Fits, Try It

THE INTERNET'S MOST-LOVED SPORT IS ALIVE AND KICKING

Last month, I managed to see the following chat room headline reworded about a dozen times: "First Lady chats, not about Monica, not about her run for the Senate, but about pets." (This reportedly to promote her new book, *Dear Socks, Dear Buddy: Kids' Letters to the First Pets.*)

This got me thinking. If someone with as much to say (potentially) to the world as Hillary Clinton could honestly approach a chat room with something as gratuitous as "letters to First Pets," has the most-loved Internet sport spiraled down the tunnel of doom?

I wondered just how many other chat room guests could offend my sensibilities in the span of a week. Thankfully, I discovered that most scheduled chat speakers are actually quite cool, with a few sticking out as not only entertaining, but socially conscious and even useful. Here's a week's sampling, which should indicate what you'll find in any given week from a variety of web sites and hosts.

March 15 – Freaks and Geeks!
SonicNet.com chatted with indie rock superdudes Built to Spill, while **ZDNet .com** talked with "Henry Kingman, the Linux Bumpkin."

March 16 – Meducation!
AHN.com (America's Health Network) hosted "Hoarseness and Vocal Problems," with suggestion on how to keep your voice intact.

March 17 – Social Medicine...
Exceptionally cool that **Roughcut.com** sponsored a "Lunch with John Waters" (maker of *Polyester, Pink Flamingos,* and his latest, *Pecker*), and another AHN.com win with an HIV-prevention series.

March 18 – Money and Paranormal Activity!
Fortune.com hosted a smart "Women and the Investing Gender Gap," and Art Bell Coast to Coast was at it on **broadcast.com**, talking about the paranormal.

March 19 – Keeping it to the left!
Erin Hart chatted at **talkspot.com** with her usual dose of liberal politics.

And of course, in addition to special promotional events, rockstars, and politicians, there are regular chats to correspond with TV and radio such as NPR's "All Things Considered" and CNN's "Crossfire."

Of course, there are still plenty of bad chat topics, but the only thing worse than a bad guest is a guest you can't find. Sites that made it *extremely* difficult to find the chat room: Pathfinder, which includes *People, Time, Entertainment Weekly,* and *Money.* Though the site is riddled with transcripts, finding one of the live chats was near impossible (short of visiting the Time Warner section of AOL, the media giant's newest "exclusive" partner). And I have to say, I haven't yet seen a Java-based chat client that didn't grind my browser to a halt.

Back in the day, chatting involved logging into a series of servers, or dialing directly, but now services such as Yahoo! run an excellent chat calendar with point-and-click chat access (although biased toward its "partners' " chats). Yahoo! also adds a bonus feature that lets users add chats to their personal Yahoo! calendars, also with a single click. Other community sites, such as **TheGlobe.com**, also offer smooth interfaces to user chat and discussion options.

If for some reason chat on the web doesn't grab you, there are still other avenues worth investigating. If you haven't used ICQ yet, you aren't just unhip, you're borderline foolish (**www.icq.com/download/**). Not only does ICQ live on your desktop and alert you when friends have logged on, it also has this way-cool randomizer feature that lets users plug into random users for random exchanges (ranging from the banal to the provocative to downright inspiring). Super bonus: ICQ is available for Mac, Windows 95, 98, NT, 3.x and CE, Java, and Palm PDAs.

IRC is still kicking, with a host of upgraded clients including PIRCH for the PC (**www.pirchat.com/**). The mIRC page (**www.mirc.co.uk/**) is great for links and the mIRC client, and sports a great FAQ. A not-so-pretty, but comprehensive, list of mIRC sites (including scripts, add-ons, and bots) can be found at **www.knfpub.com/axe/chat/irc.html#mIRC.**

One of the few places 3D has been able to stay alive online is in chat environments, laden with avatars getting busy in clubs and space scenes. Active Worlds, maker of the historic and epic AlphaWorld, is still shaking it up at **www.activeworlds.com.** Geeks will love Hard Drive City, a streaming VRML frenzy of frenetic goofiness at **www .hdcity.com/geek_4.html.** But for some seriously well-designed spaces, probably the most beautiful to be found, check out OZ's virtual platform at **oz.com.** Chat never looked so good.

I wondered just how many other chat room guests could offend my sensibilities in the span of a week. Thankfully, most chat speakers are actually quite cool.

What's most fantastic about chat is that it isn't so much a matter of who's talking or how cool (or uncool) they are, so much as the community that gathers to participate. Beauty or academically challenging topics mean nothing if no one has anything interesting to say. That's what I love about the Internet; we make it work (and fail).

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GAME THEORY

T. LIAM MCDONALD
is a veteran of PC Gamer magazine and is much bigger than he looks in this picture, so keep that in mind before writing him any hate mail at **tmcdonald@maximumpc.com**.

Origin's Online Land Rush

WANNA BUY A BRIDGE? HOW ABOUT A VIRTUAL ONE?

When Origin Systems recently announced that it was turning its attention exclusively to online games, I wondered just what the powers that be were thinking.

My entire experience with *Ultima Online* had been limited to a few early, and profoundly unpleasant, sessions filled with lag and hangs. Origin has since worked hard to eliminate the problems. Several friends and colleagues are hooked on *UO*, even flight-sim experts who never bother with anything without a FLIR. It was clear *UO* had passed the rocky stretch and was inspiring a devoted following. But was it devoted enough to support a whole company at the expense of narrative, stand-alone *Wing Commander* and *Ultima* games? I wondered.

And then I came upon this while cruising for Godzilla memorabilia on eBay, the Internet auction site: "Ultima Online w/Castle 2,500,000 Gold + More," 23 bids, high bid $1,575.

That is one thousand, five hundred, and seventy five actual US of A greenbacks. Not virtual money or gold pieces. This is a $1,575 hole in your checking account. A freak, I thought, and then I came upon this: "Ultima Online Account w/ Castle & 1,000,000gp," 12 bids, $860 high bid. And this: "Ultima Online—UO account—placed keep & tower," 17 bids, $910 high bid. Finally, this one went live as I was sitting down to write: "Rivan of SAS's Ultima Online Account (Sonoma)," $6,000 minimum bid (no takers as of press time). There were about a dozen others commanding bids over $100.

The seller of the "Ultimate" account ("Ladymishka") described what you'd get for your $1,500+: a two-year-old account with pumped characters on different shards, several houses, a placed castle and keep deed, a secure tower, smelting house, powerful items, 2.5 million gold units, and more.

The big deal for *UO* fans is the placed castle and keep deed, which are impossible to find now that the world is so built up. Serious adventurers and adventure groups or guilds crave these things in the game. Like all good capitalism, it's about supply and demand, even for something that doesn't exist. As Richard Garriott observes, "We're fascinated by it because it's a verification of what we're trying to do. This is proof that virtual real-estate assets are a real-world commodity. It's blurring the line between virtual reality and the real world."

In light of this kind of fanatical devotion, Origin's decision to focus on online at the exclusion of single-player games seems the most sensible course. With 125,000 *Ultima Online* users willing to pony up $10 a month… well, you can do the math. Clearly it has the pulse of the online gamers better than anyone else. As Origin expands outward to bring its other product lines into the online arena, it'll find even more opportunities that it is uniquely positioned, through hard-earned trial and error, to exploit. I recently covered its ambitious *Jane's World War* for *PC Gamer* magazine, and this persistent-world online combat arena promises to do for aerial combat what *UO* does for role-playing, with massive air battles, persistent damage, and ongoing "live" wars.

Then there is Andy Hollis, who is leaving the hardcore Jane's sim line to manage the creation of a persistent-world *Wing Commander* online game, which is still a couple years from fruition. As Andy said, "It's the next big frontier in computer gaming. The last time I was this excited about the future potential for computer games was back in the old days (Commodore 64, Atari 800). Building products in the online space is more about growing player communities than just building the product itself."

I contacted a few of the people bidding $1,000 and over for accounts, and their explanations seem reasonable on the surface. Michael Kellar puts it this way: "If you play *Ultima Online*, you understand that there is a severe shortage of places to put houses. I've been playing the game since the early days and have several small places. Yet for what we want to do as a guild, we need a *very* large place. Buying 'placed' towers or keeps is about the only way someone can acquire one."

"I'm interested in the account because it offers an opportunity I would never get otherwise," says Rene Blaser of Switzerland. "Housing space is sparse, so to get a castle is a lucky stroke. Since I can afford to pay the money to get some real fun out of it, I just pay it."

I almost started believing it's not unusual to spend that kind of money for something you're really into, but then I got to thinking of the real, physical things I could get with $1,500: a bad-ass big-screen TV with DVD player, two tickets to Hawaii, five rounds at Pebble Beach, or a mortgage payment. That is, a mortgage payment on my actual house… on an actual plot of land, in an *actual* town. It doesn't have a placed tower, but at least it keeps the rain off. ✹

"This is proof that virtual real-estate assets are a real-world commodity. It's blurring the line between virtual reality and the real world."

—UO Creator, Richard Garriott

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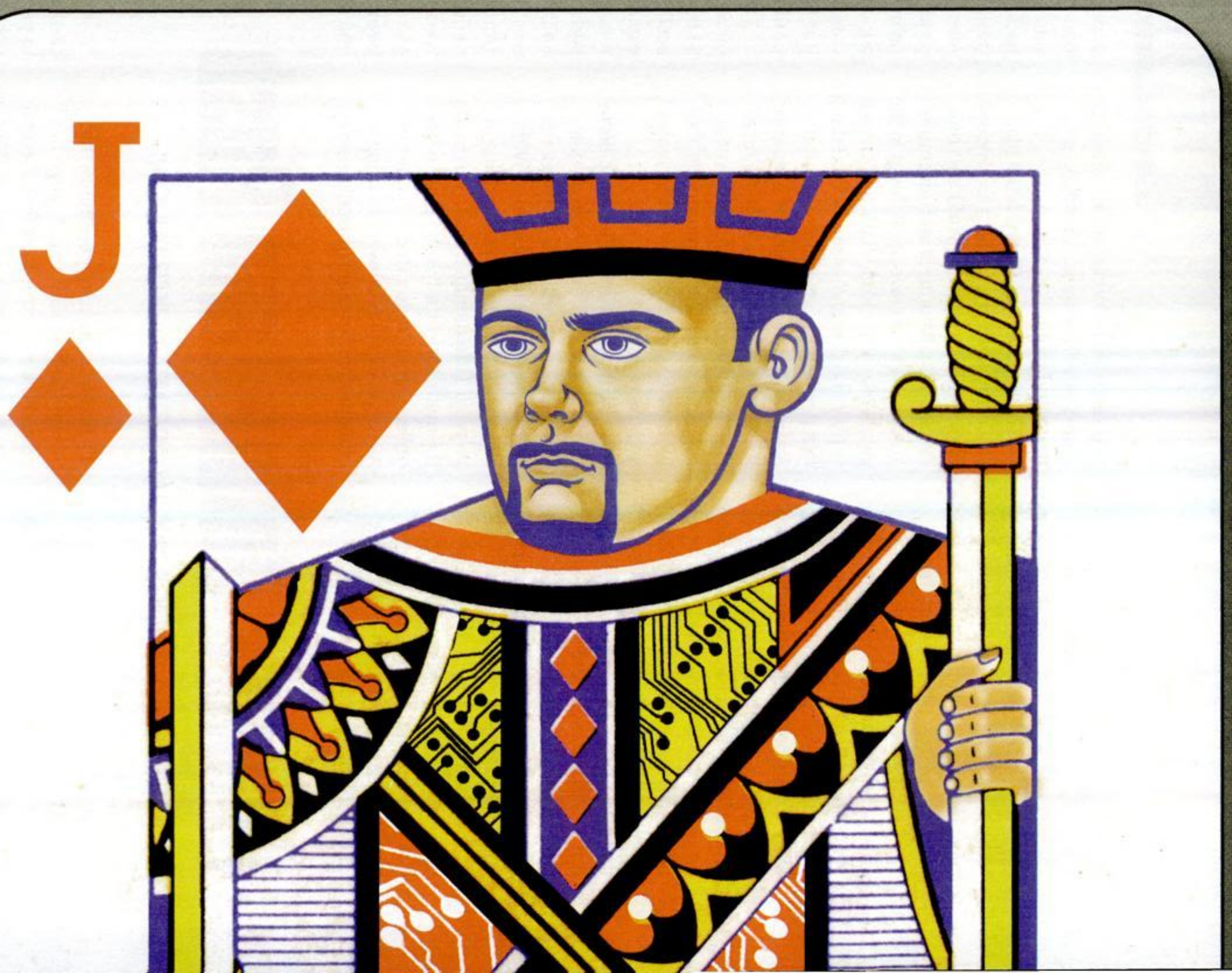
JACK OF ALL TRADES

Diamond scored a hit with the RIO MP3 player, but can it survive without 3Dfx? Vice President and General Manager Scott Voorhees thinks so.



Maximum PC Diamond branches out into a lot of different areas—video, sound, motherboards, and portable MP3 players to name a few—but Diamond doesn't do any of the actual engineering.

Voorhees We take a raw product idea from an outside house, and then, understanding what the market really wants, change the product configurations, getting the right price point and the right feature set, and taking that to market.

Maximum PC You receive reference drivers from the company that creates the chipsets on your videocards, but how much more does Diamond add?

Voorhees I'd say Diamond probably puts two man years on top of the driver work that the chip company has already done. It takes us from four to six months to get the product out the door with four or five engineers on it full time. The silicon companies are silicon experts, not software experts, and they're not board-design experts. That's our ID.

We have two tracks when we receive the source code: We have a stability track and we have a

performance track. We'll take the hit of being second to market because we would rather have highly reliable, as well as hopefully higher performing, drivers.

Maximum PC What's been the biggest disappointment for Diamond?

Voorhees Certainly, we're not happy with our financial results over the past year and a half, and we shouldn't be. We have excellent technology and excellent brand, but we've had serious setbacks, as well as competitive attacks on our business model.

Maximum PC How much of a thorn is Creative Labs in Diamond's side?

Voorhees Creative is a very worthy competitor. I think about them when I get up in the morning and when I go to bed a night. And Creative Labs tends to copy us, which gets my blood boiling. But it's also flattering. Ultimately, it forces us to keep one step ahead.

Maximum PC Looking at Sound Blaster Live! and E-Mu Systems, Creative can create chips. Can Diamond really compete in the sound-card arena?

Voorhees Actually, from a technology perspective, Diamond is better prepared to compete in the sound market. Creative is first to market—they've been there for a long time. People will buy a product just because it's Creative. If you look at the head-to-head reviews of the Diamond MX300, which competes directly against the Sound Blaster Live! value, we win every review just for the quality and the surround-sound basis [*Diamond's MX300 received a 9/Kick-Ass in Maximum PC; the Sound Blaster Live! received a 10/Kick-Ass—Editor*]. A3D is much better than EAX. What we need to do is work on building the lion's share of the market awareness.

Maximum PC Does it bother you that 3Dfx said "It wasn't OEMs like Diamond that made Voodoo a success; it was 3Dfx" ?

Voorhees Yes, because it wasn't true. 3Dfx's memory serves them best. Rewind back to when they were knocking on our door and nobody was taking their first Voodoo chipset and ask "OK, who generated 90% of 3Dfx's revenue?"

Maximum PC Diamond recently was on the record saying that 3Dfx was becoming less important. Do you agree with that?

Voorhees I do. When 3Dfx introduced Banshee, it was a step backward in technology because it only had one texture-mapping unit. We had to target the casual-gamer market with that part, as opposed to the hardcore gamer. This shifted a larger portion of our revenues to nVidia-based architectures because they were higher performing.

Maximum PC Let's pretend 3Dfx didn't buy STB. Would you still be offering a Voodoo³ card alongside your TNT offering?

Voorhees That's actually hard to say, given the performance of TNT2. If you asked me this six months ago, absolutely. We probably would have continued targeting the TNT2 at the high-end mainstream user

PROFILE

AND HE WOULD BE?

Scott Voorhees is the Vice President/General Manager of Diamond's Multimedia Division. He deals the cards for just about every Diamond product—except the Rio, which is in another division.

AND I WOULD KNOW HIM FROM?

If you have a Voodoo-based graphics card or an A3D-compliant soundcard, odds are it's from Diamond. And thanks to the RIAA's lawsuit, MP3s are as popular as ever.

AND I WOULD CARE BECAUSE?

From video to audio to home networking and motherboards, Diamond has the high-stakes products to satisfy your peripheral fix. About the only thing they don't have is 3Dfx's Voodoo³ chip and Creative Labs' raw engineering muscle.

ILLUSTRATION BY ANITA KUNZ

and targeting the Voodoo^3 at the hardcore gamer market. But hindsight is 20/20. Now, I'm glad things happened the way they did because TNT2 is clearly a better chip, both from an architecture as well as a performance standpoint.

Maximum PC Is Diamond doing a Savage4 card?

Voorhees Yes.

Maximum PC What about PowerVR?

Voorhees No.

Maximum PC Does PowerVR stand a snowball's chance in hell of surviving?

Voorhees They are not on our radar. It was almost a year ago that they were in our offices talking about this card, and it's still not out. If it is, they don't want to show it to us.

Maximum PC What's left?

Voorhees Well, there's Permedia 3 [laughs]. And we've got an exclusive deal with IBM for an extremely high-end chipset from their RISC 6000 division, which we're using in our professional graphics division. It brings the power of $2,000 graphics cards in at $500.

Maximum PC In your mind, what's Diamond's best product?

Voorhees Diamond defined a market with the Monster 3D. Nobody paid any attention to 3Dfx, and Diamond was willing to take the risk and invested a lot in that market. It really brought 3D gaming to the forefront.

And then the Diamond Rio, because it's a brand new product category that Diamond has defined. So it does give us the opportunity to build a brand strength equivalent to a Xerox machine or Kleenex.

Maximum PC The Rio has been a popular product for Diamond. Does it bother you that the RIAA only sued Diamond and no one else?

Voorhees No. The RIAA suit is probably the best thing that has ever happened to Diamond. Our sell-through of the product has been phenomenal. And we attribute that somewhat to the extra visibility we got from the lawsuit.

Look at it from the RIAA's standpoint—they want to go after the person who has the most visibility and generate as much public awareness. They want to pick a target that people are going to write about so the smaller guys might think twice about getting into the market in the first place.

Maximum PC Can Rio become as strong a brand as Sony's Walkman?

Voorhees Yes. In fact, I just returned from CeBIT in Hanover, and there were several Taiwanese companies explaining their product by saying, "This is a Rio," as opposed to saying, "This is an MP3 device."

Maximum PC Why did Diamond release the Rio with only 32MB of memory?

Voorhees The technologies used were the best available in high volume at the time. Diamond will be introducing a 64MB Rio PMP300 translucent teal unit in early April. Additionally, a re-vamp of RioPort.com will be launched in April that will provide additional functionality and search capabilities.

Maximum PC Do you think $200 is too much for an eight-song player?

Voorhees No. Diamond always sets the technology bar and people run to it. And there will always be lower-priced competition and higher-priced competition.

Maximum PC Is there a black sheep of the Diamond family?

Voorhees We blew DVD because the design was just far too expensive, more than twice the price of a CD drive. Now DVD drives have come down in price and this current generation is using them in lieu of a CD-ROM drive. We spent a lot of effort and we realized at the end of the day that was foolish.

Maximum PC Is DVD dead?

Voorhees No. I don't think DVD is dead, but I also don't think people want to watch DVD movies on their computer. When Diamond was working on the DVD kit, it was far too early. There were no DVD titles available.

Maximum PC But there are no compelling software titles now. If people don't want to watch movies on their monitor, then what's it going to take for developers to start supporting the technology?

Voorhees I'm told there's going to be an incredibly vast number of DVD titles available by Christmas 1999.

Maximum PC Sure... Outside the gaming space, what's the next frontier for 3D?

Voorhees Certainly the web will be the next area for 3D.

Maximum PC And what's the major hurdle beyond bandwidth?

Voorhees People's imagination. Not customers, but software providers. It's our fault. We've got to drive that market.

> "the RIAA suit is probably the best thing that ever happened to Diamond. our sell-through has been phenomenal, and we attribute that to the lawsuit."

PHOTOGRAPHY BY ED HOMICH

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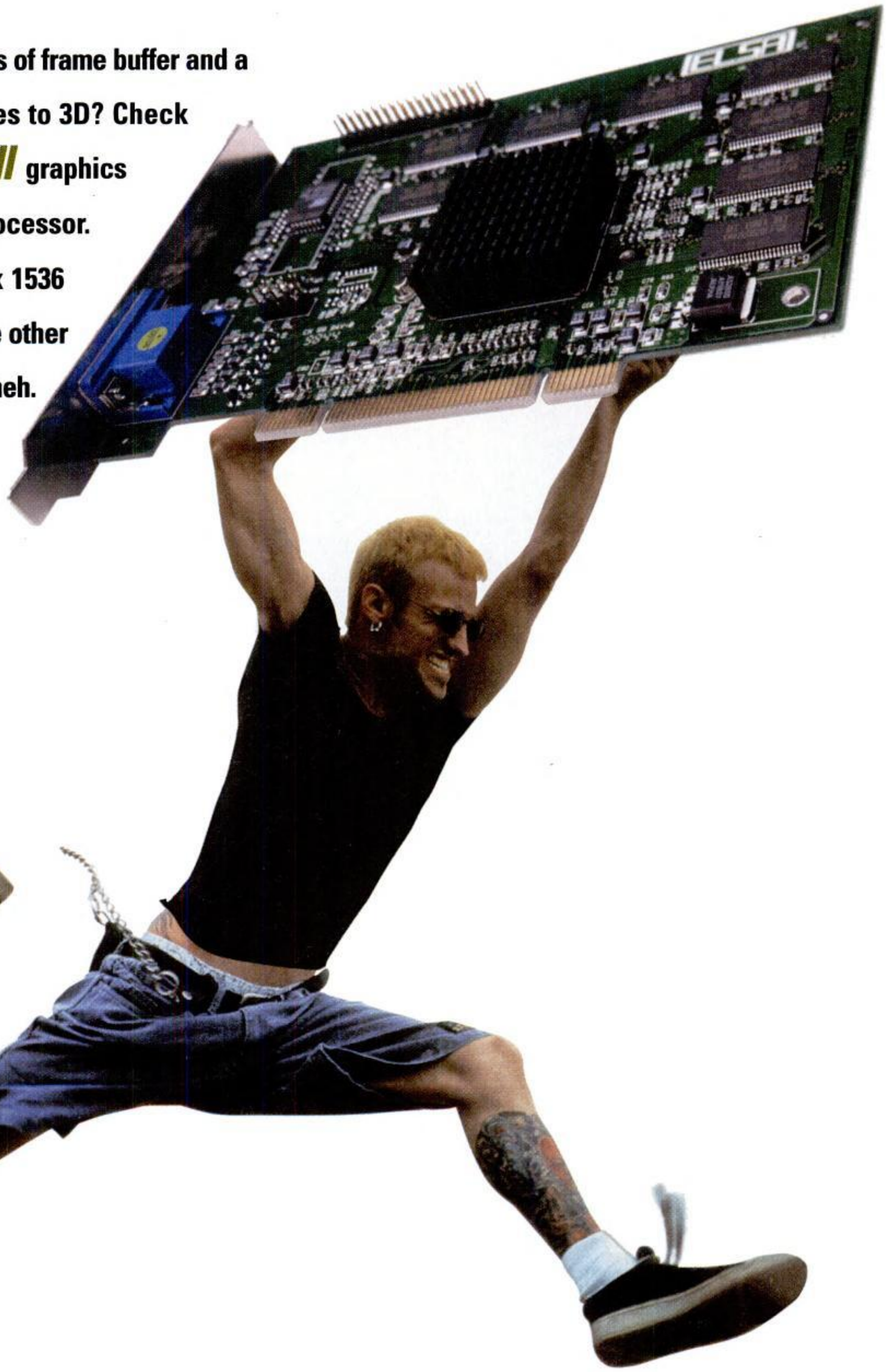
ABOVE ALL, ELSA.

Be honest, you ever see what 16 megs of frame buffer and a 32-bit color TwiN-Texel pipeline does to 3D? Check out the new ELSA *ERAZOR III* graphics accelerator with the NVIDIA RIVA TNT2 processor. It runs 3D at an unheard of 2048 x 1536 resolution and 2D that makes all the other stuff a dream. Is it fast?...heh...heh...heh.



ELSA

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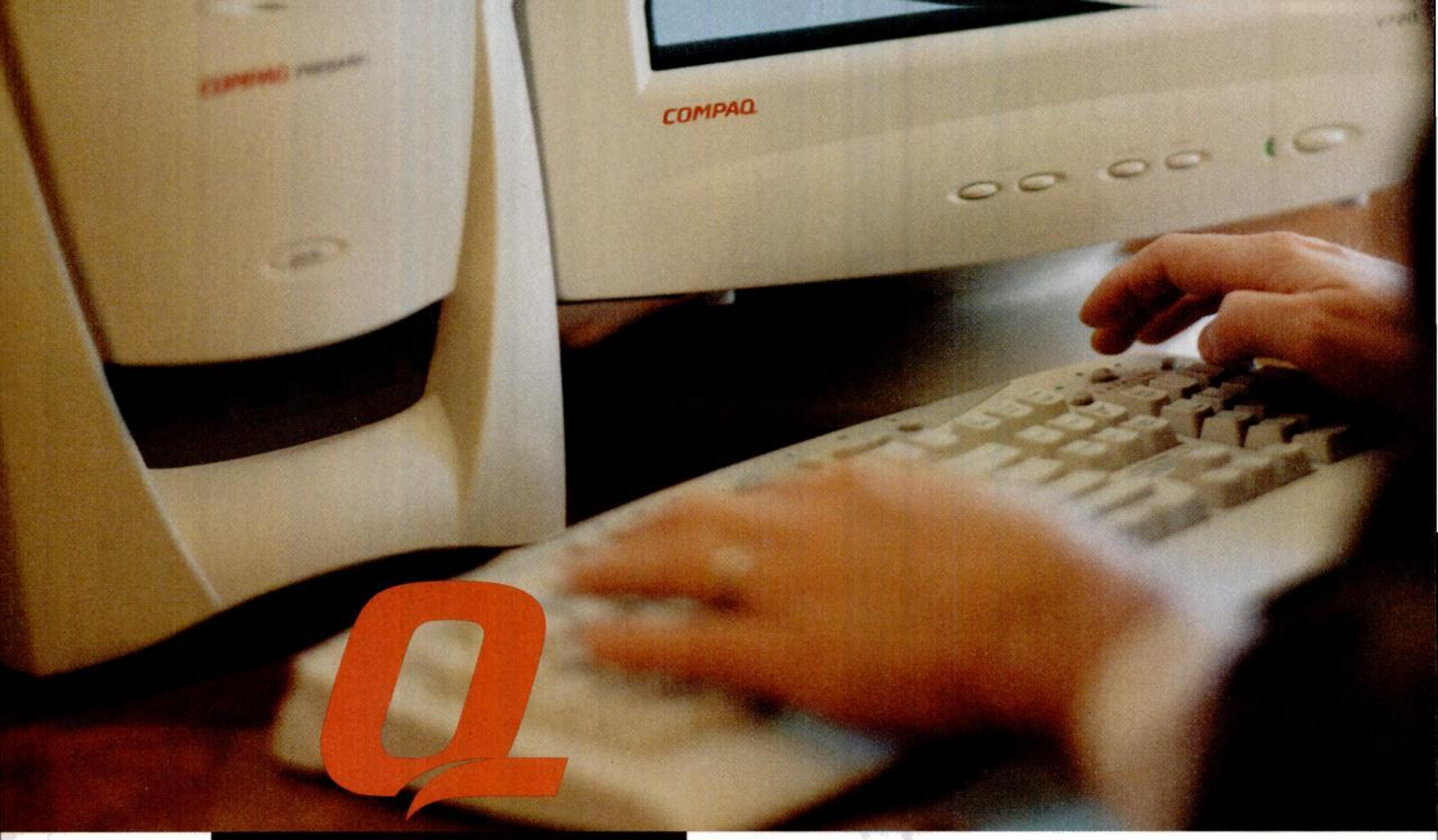

Where do performance and price come together?

Compaq Awards

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WIN LIST • **PRESARIO 5600 SERIES**

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6X DVD-ROM Drive[5]	6X DVD-ROM Drive[5]
Diamond Viper 550 AGP w/16 MB SDRAM	Diamond Viper 550 AGP w/16 MB SDRAM
Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
6.0Mb Max Digital Modem[6]	56K ITU V.90 Modem[2]
JBL Pro Studio w/Dual Subwoofers	JBL Pro Speakers
Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]
10 Mbps Ethernet Port, Cable Modem Ready[8]	10 Mbps Ethernet Port, Cable Modem Ready[8]
Microsoft® Office 97 Small Business Edition®	Home Phoneline Networking[7]
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450 MHz AMD-K6® III with 3D Now! Technology	450 MHz AMD-K6 III with 3D Now! Technology	400 MHz AMD-K6 III with 3D Now! Technology	400 MHz AMD-K6 III with 3D Now! Technology
128 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB	64 MB SyncDRAM expandable to 384 MB	64 MB SyncDRAM expandable to 384 MB
13.0 GB UltraDMA Hard Drive[1]	13.0 GB UltraDMA Hard Drive[1]	10.0 GB UltraDMA Hard Drive[1]	10.0 GB UltraDMA Hard Drive[1]
52X True X CD-ROM Drive[9]	52X True X CD-ROM Drive[9]	6X DVD-ROM Drive[5]	52X True X CD-ROM Drive[9]
2X AGP Graphics w/8 MB SDRAM	2X AGP Graphics w/8 MB SDRAM	Diamond Viper 550 AGP w/16 MB SDRAM	2X AGP Graphics w/8 MB SDRAM
Aureal 8820 PCI Audio Card	Aureal 8820 PCI Audio Card	Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer
Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]	TriLevel Cache—1.3 MB
TriLevel Cache—1.3 MB	TriLevel Cache—1.3 MB	TriLevel Cache—1.3 MB	Microsoft Featured Home Collection + MS Word
Iomega Zip Built-In™ Drive with 2 disks	Microsoft Featured Home Collection + MS Word	Microsoft Featured Home Collection + MS Word	Microsoft Windows98
Microsoft Office 97 Small Business Edition	Microsoft Windows98	Microsoft Windows98	Compaq V720 17" Monitor (15.9" VIA)
Microsoft Windows98	Compaq V720 17" Monitor (15.9" VIA)	Compaq V720 17" Monitor (15.9" VIA)	
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SPOT THE

HAVE YOU BEEN BITTEN BY COUNTERFEIT HARDWARE AND SOFTWARE?

Check your own mouse for the following constants: The 2.0A mouse features two screw holes on the bottom and was manufactured in Taiwan or Mexico. The newer 2.1A mouse doesn't have any screw holes and was made in China or Mexico. 2.1A mice labels are the same color as the mouse exterior, and the gray-green lettering should match the Microsoft logo on the top of the mouse.

A mouse's Certificate of Authenticity sticker (attached to the cord) should provide the final verdict on whether you've been had. When you hold the sticker near a hot bulb, the oval "genuine" logo should disappear. When looking for fakes, always remember that bundled mice use a matte finish, while retail mice are high-gloss plastic.

IF AL CAPONE LIVED TODAY, you wouldn't find him bootlegging liquor or running numbers on Chicago's south side. No, if Scarface lived today, his rackets would be more profitable and less dangerous—such as selling fake mice and bogus copies of Windows 98.

Stiffing consumers with counterfeit hardware and software is a multimillion dollar business that's attracting the attention of organized crime rings from the Russian Mafia to the Pacific Rim Triads. From CPUs and RAM to Windows 98 and even look-alike mice, counterfeiters copy, alter, and misrepresent almost anything they can to make a quick buck off trusting consumers. And the perps keep perping. Last month, we reported on seizures of bogus Microsoft Certificates of Authenticity in California, forged copies of *Office 97* in the United Kingdom, and a U.S. Attorney's Office investigation of counterfeit Adaptec SCSI cards. This month, a French hardware site reported that more

FACT JUST THIS FEBRUARY, $30 MILLION IN COUNTERFEIT SOFTWARE AND LICENSES WERE SEIZED BY POLICE IN SOUTHERN CALIFORNIA.

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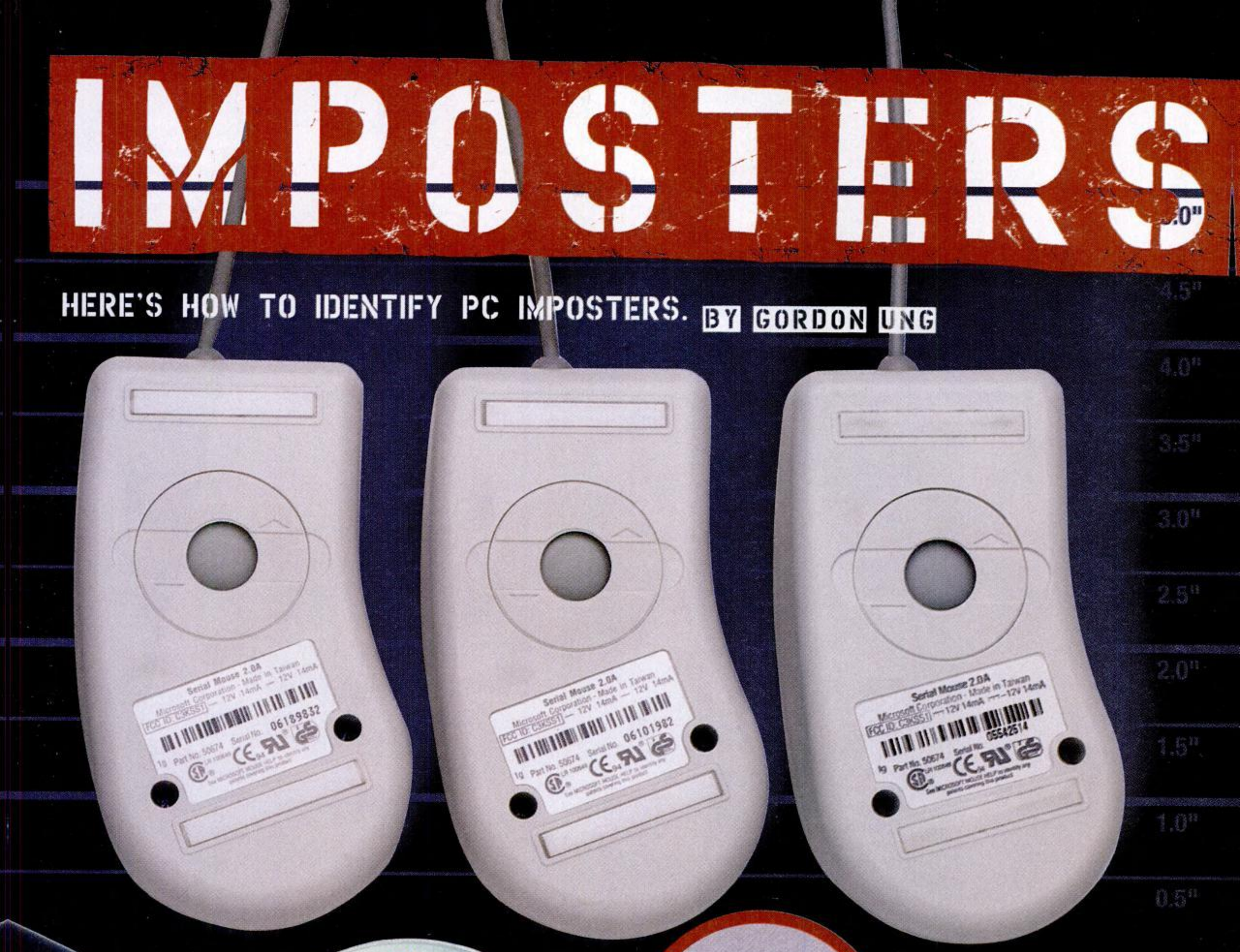
IMPOSTERS

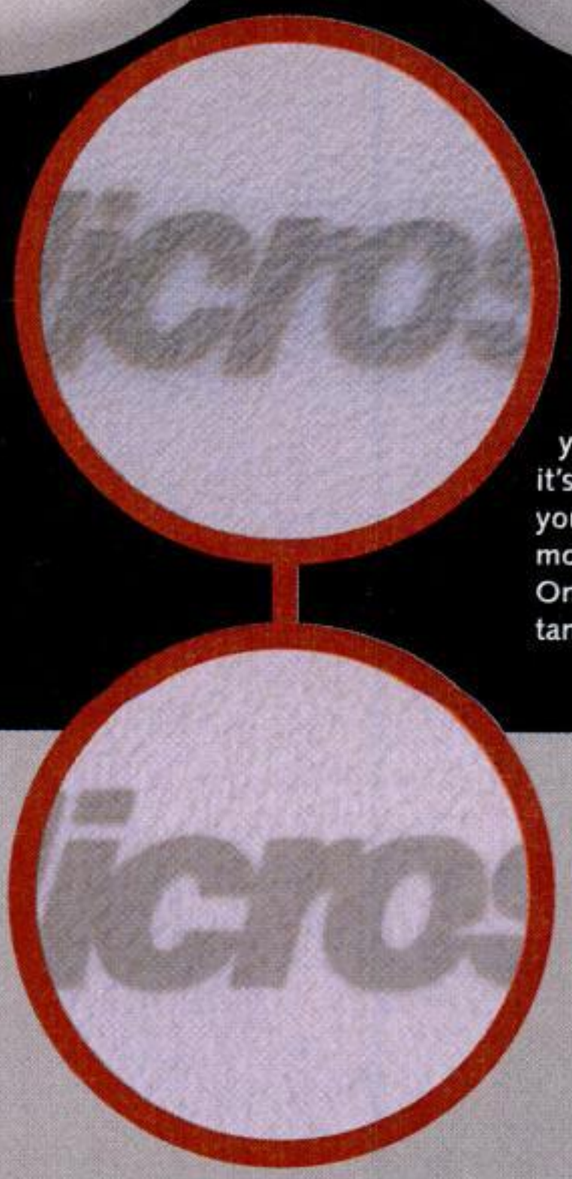
HERE'S HOW TO IDENTIFY PC IMPOSTERS.

BY GORDON UNG



All of these mice are supposed to be Microsoft's 2.0A model, but telltale signs can reveal imposters. In fact, only the second mouse from the left is the genuine article. The rest are fakes recovered by Microsoft during raids. Lord knows what heinous shams have been wrought with fake Logitech mice.

CASE 001: MICROSOFT MOUSE 2.0A



Counterfeiters can't silkscreen to save their lives. Of the faux mice pictured here, none had quality printing on the top of its body. Grab your magnifying glass and check out your own mouse's Microsoft logo: If it's blurry like the example on the top, you know you don't have an authentic mouse, like the example on the bottom. On 2.0A mice, printing should also be tan, matching the color of the cord.

PHOTOGRAPHY BY AARON LAUER

than 5,000 counterfeit ASUS motherboards are being distributed in Europe.

Think the counterfeiters can't reach you? Compare your own hardware and software to the photographs on the next few pages to see if you've been had.

THE MOB'S REACH

CPU re-marking may not be the most widespread counterfeiting scheme, but it's definitely the ballsiest. The fraud's strategy is simple: Buy a load of low-speed processors, overclock them a few bins, and change the serial numbers to reflect the higher speed. Actually, you might consider yourself lucky to buy one of these CPUs—at least it would run (albeit dubiously) at the higher speed. Some re-markers don't even bother to overclock their CPUs before faking the serial numbers.

"There are literally millions of bogus CPUs out there," said one reseller who asked not to be identified. And he should know. He makes a living reselling refurbished equipment, including re-marked CPUs from second-tier system makers who've been burned by counterfeiters. "These

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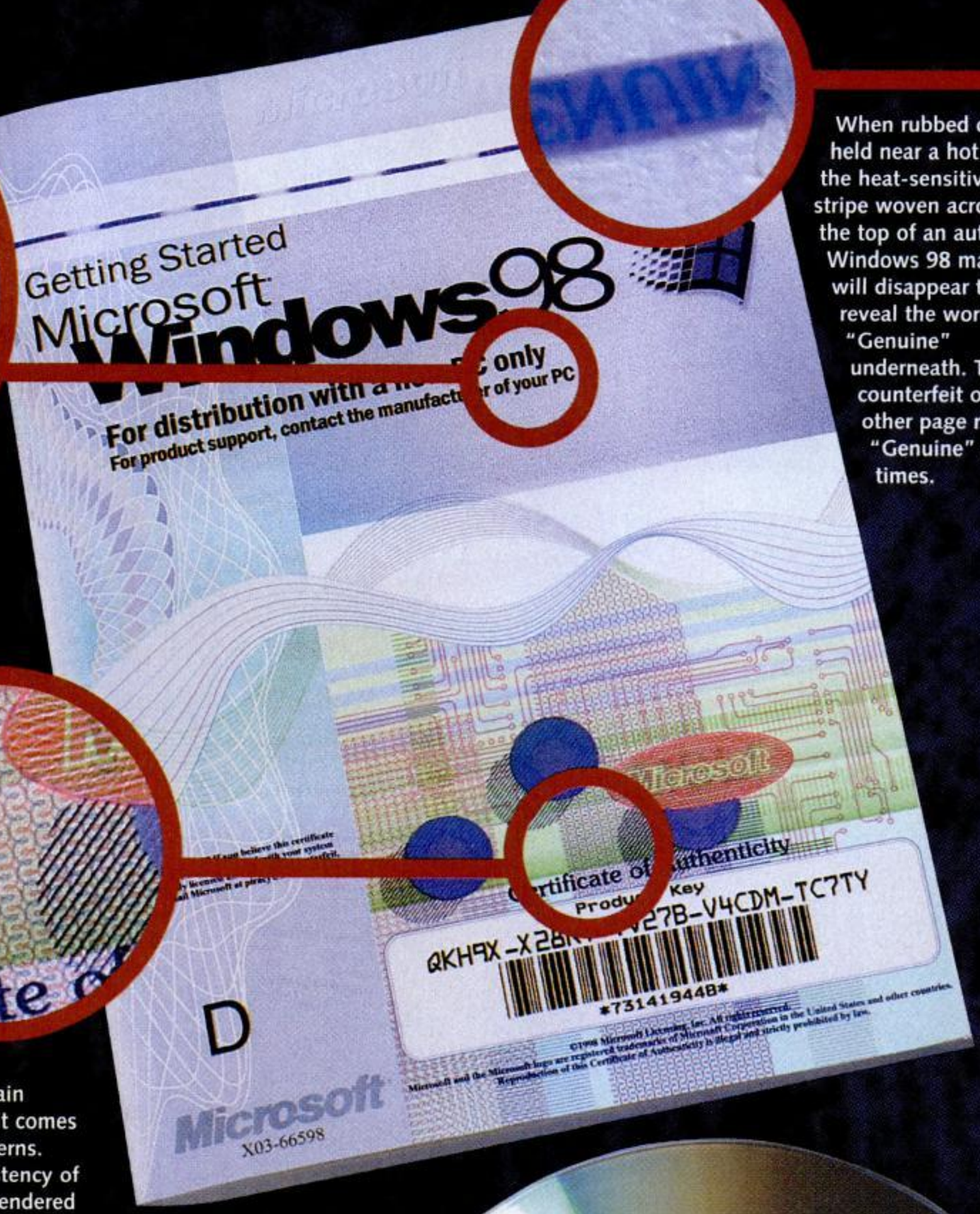
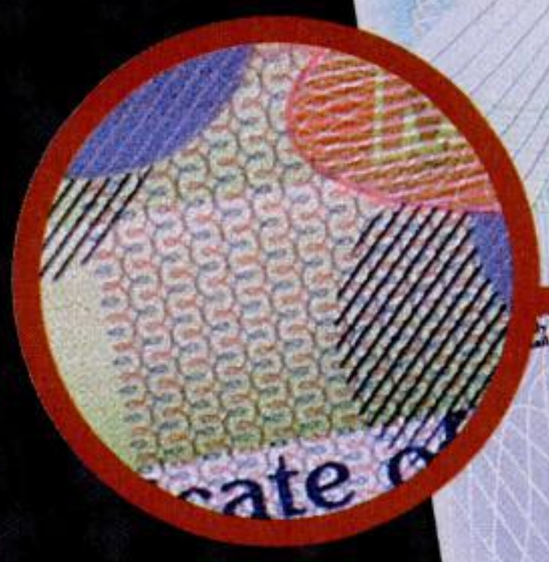
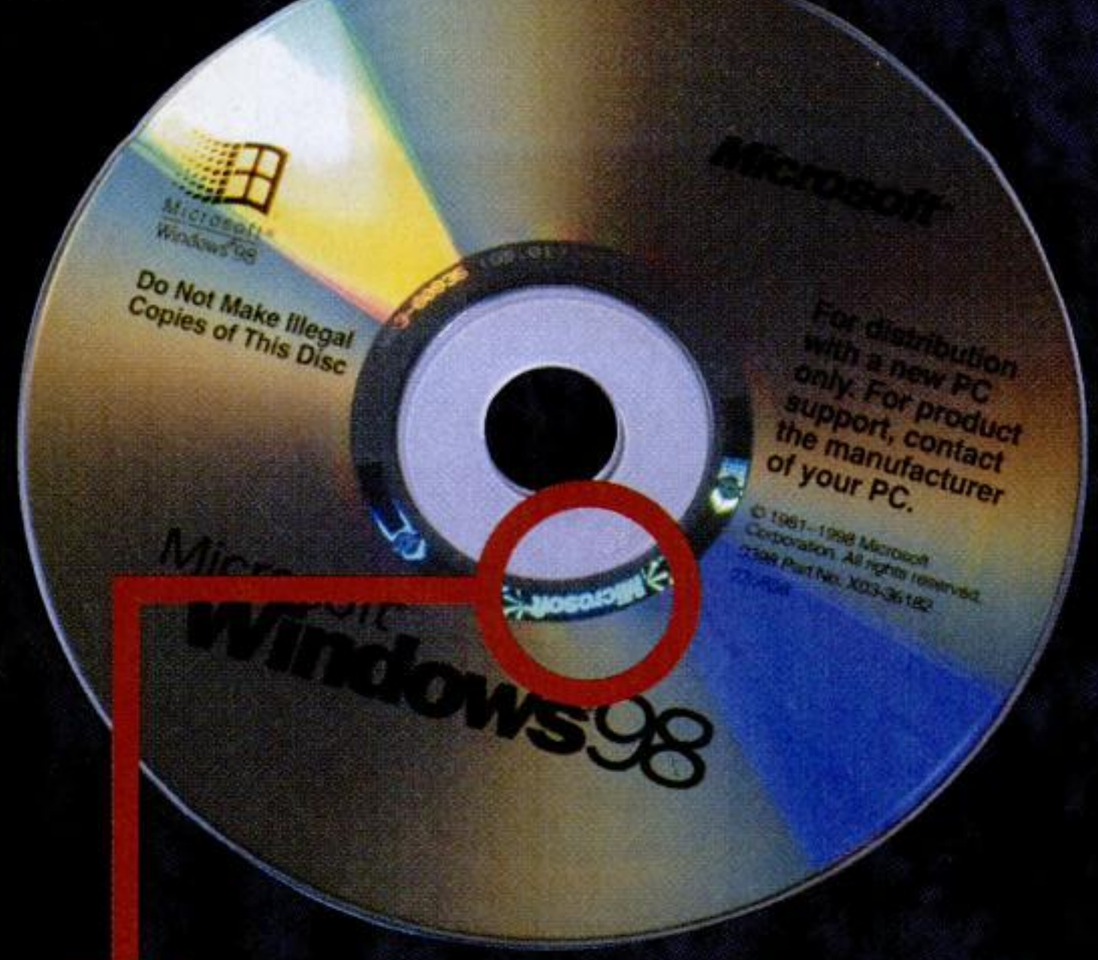
FACT WHEN COUNTERFEITERS WANT QUALITY, THEY GO TO THE SOURCE. IN JULY 1998, THIEVES MADE OFF WITH 115,000 AUTHENTIC WINDOWS 98 MANUAL COVERS FROM A SCOTLAND PRINTING PLANT.



When rubbed or held near a hot bulb, the heat-sensitive stripe woven across the top of an authentic Windows 98 manual will disappear to reveal the word "Genuine" underneath. The counterfeit on the other page reads "Genuine" at all times.



Counterfeit collateral gets plain laughable when it comes to repeating patterns. Notice the consistency of these computer-rendered curlicue lines. Now take a gawk at the fake: While these lines look OK to the naked eye, up close you can see that someone—perhaps the counterfeiter's eight-year-old kid—actually drew them by hand


Microsoft
Windows 98
Do Not Make Illegal Copies of This Disc
For distribution with a new PC only. For product support, contact the manufacturer of your PC.
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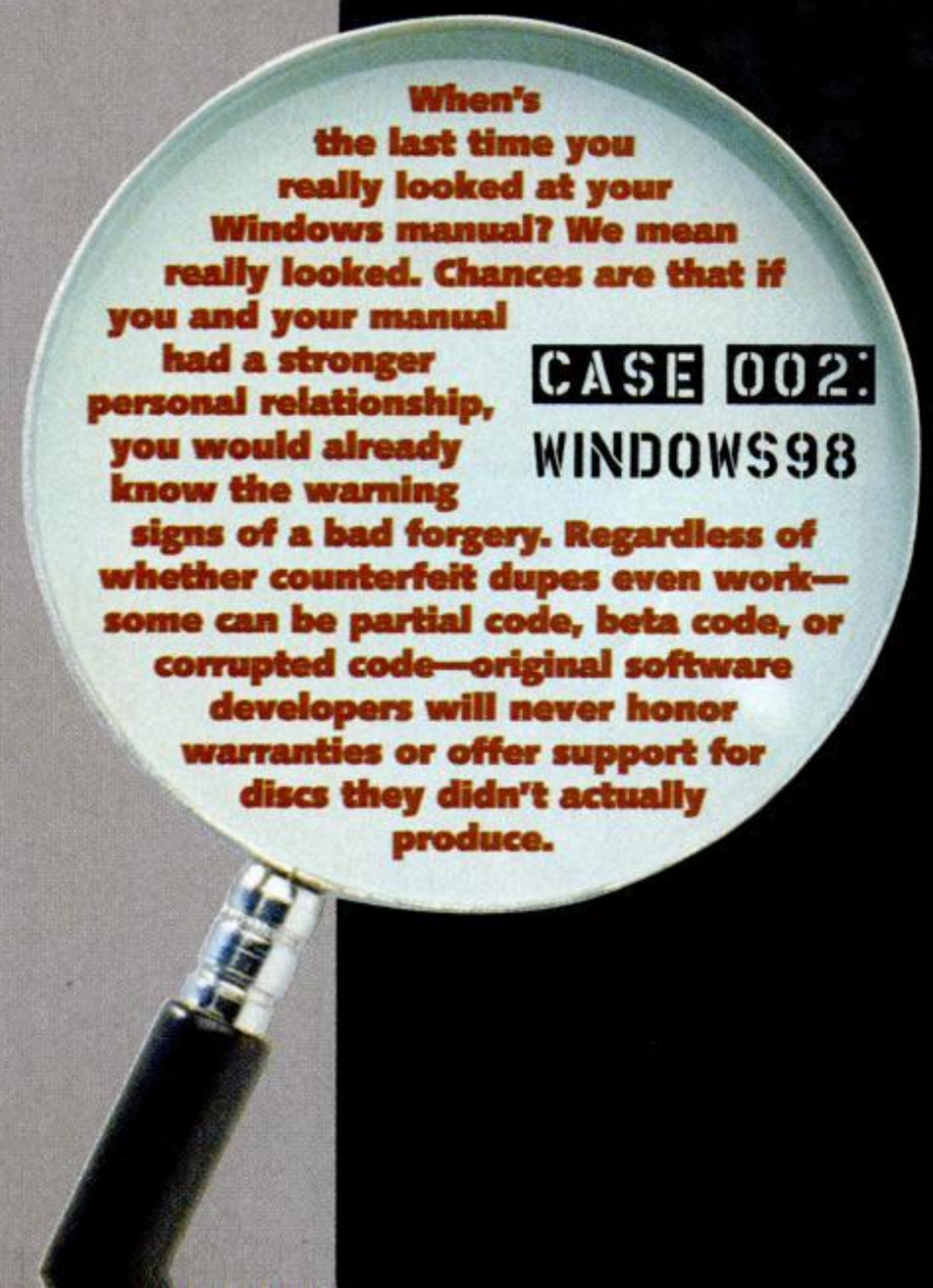
Windows 98


When's the last time you really looked at your Windows manual? We mean really looked. Chances are that if you and your manual had a stronger personal relationship, you would already know the warning signs of a bad forgery. Regardless of whether counterfeit dupes even work—some can be partial code, beta code, or corrupted code—original software developers will never honor warranties or offer support for discs they didn't actually produce.
CASE 002:
WINDOWS98

Counterfeiters just can't get this one right: Hold your Windows 98 disc under good light at an angle, and you'll see the words Microsoft and Genuine interlaced together. Tilt the disc up and down, and either Microsoft or Genuine will appear. The counterfeit to the right makes an attempt to fashion a legitimate hologram, but it's really just a colorful mess.

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Small print is the counterfeiter's nightmare. Here the counterfeiter's repeating Microsoft logos are lost and blotchy when superimposed over the smaller repeating Microsoft type. Also note the bad font match and improperly wide letter-spacing for the letters "PC".

If you're a graphic artist or armchair typography buff, you'll immediately notice differences between the type on real and forged discs. Funny how the text on the left-hand side of the disc warns people not to make illegal copies!

◀ 49

PC makers are the guys who buy thousands of them. They think they're getting a good deal in a spot buy, but the spot buy becomes a disaster."

To keep his CPUs from being used again in defrauding schemes, the reseller obliterates the faux high-speed markings and labels the processors as refurbished and at their proper speeds.

Processor manufacturers say the reseller's assessment of the number of re-marked CPUs may be overstated, but they recognize re-marking is a problem. After all, even if 100,000 CPUs are re-marked annually, it's not an annoyance, it's a crime wave. Intel officials say law enforcement actions against counterfeiters increased 30% during an eight-month period in 1998 compared to the same period in 1997. Part of that increase comes from better worldwide police training, but counterfeiting activity has also ramped up. Intel has been so vexed by the problem, it's introduced a utility that can immediately discern whether a Pentium III or Pentium III Xeon is running faster than it's supposed to be, a classic sign of re-marking (go to **http://support.intel.com/support/processors/tools/frequencyid/freqid.htm** for the test).

GOING AFTER MR. BIG

Software counterfeiting might be more prevalent than CPU re-marking. It's certainly more quantifiable. While CPU makers haven't been able to track how many re-marked CPUs are in circulation, software companies can easily attest to the number of counterfeit CD-ROMs recovered during busts. In January, Microsoft recovered 55,000 counterfeit copies of *Office 97*, worth about $55 million—and that's an illicit load that can't be rooted out by drug-sniffing dogs and would never attract the attention of a nosy beat cop. Counterfeit CD-ROMs can be perfect dupes that work as expected, partial dupes, beta dupes, or corrupted dupes. And you'd be surprised by how hokey their bogus packaging really is when observed with a trained eye.

Because of its dominance in personal computing, Microsoft tends to be the most popular target among counterfeiters, and it's normal for the company to recover warehouses full of sham goods. In addition to forging the OSes, counterfeiters pirate the entire Microsoft lineup, from *Office* to *Visual Basic* to *Encarta*. In fact, software, music, and movies topped the list of counterfeit goods confiscated by the U.S. Customs in 1997. Name any high-profile application, and it's sure to be counterfeited and on sale at a vendor near you.

52 ▶

◀51

IN.THE.CHANNELS

Counterfeiters normally sell their swag in bulk to small mom-and-pop computer stores, which then integrate the hardware and software into system bundles. With today's thin margins on PC sales, the mom-and-pops can't help but bite at such bargains. It's always easier to hide counterfeit goods in sealed systems, but nonintegrated counterfeit products (packaged in bogus cartons) also land on store shelves, though these cases are relatively rare.

Counterfeiters know just how to exploit human greed with creative packaging. For example, if you saw a shrink-wrapped version of *Visual C++ Professional* selling for $75 at a local computer show, you'd instantly get a Han Solo "bad feeling" and avoid purchasing what should be a $400 product. But if that software was labeled "academic" or "OEM," you'd figure the vendor was just bending his licensing deal with Microsoft. No harm done, right?

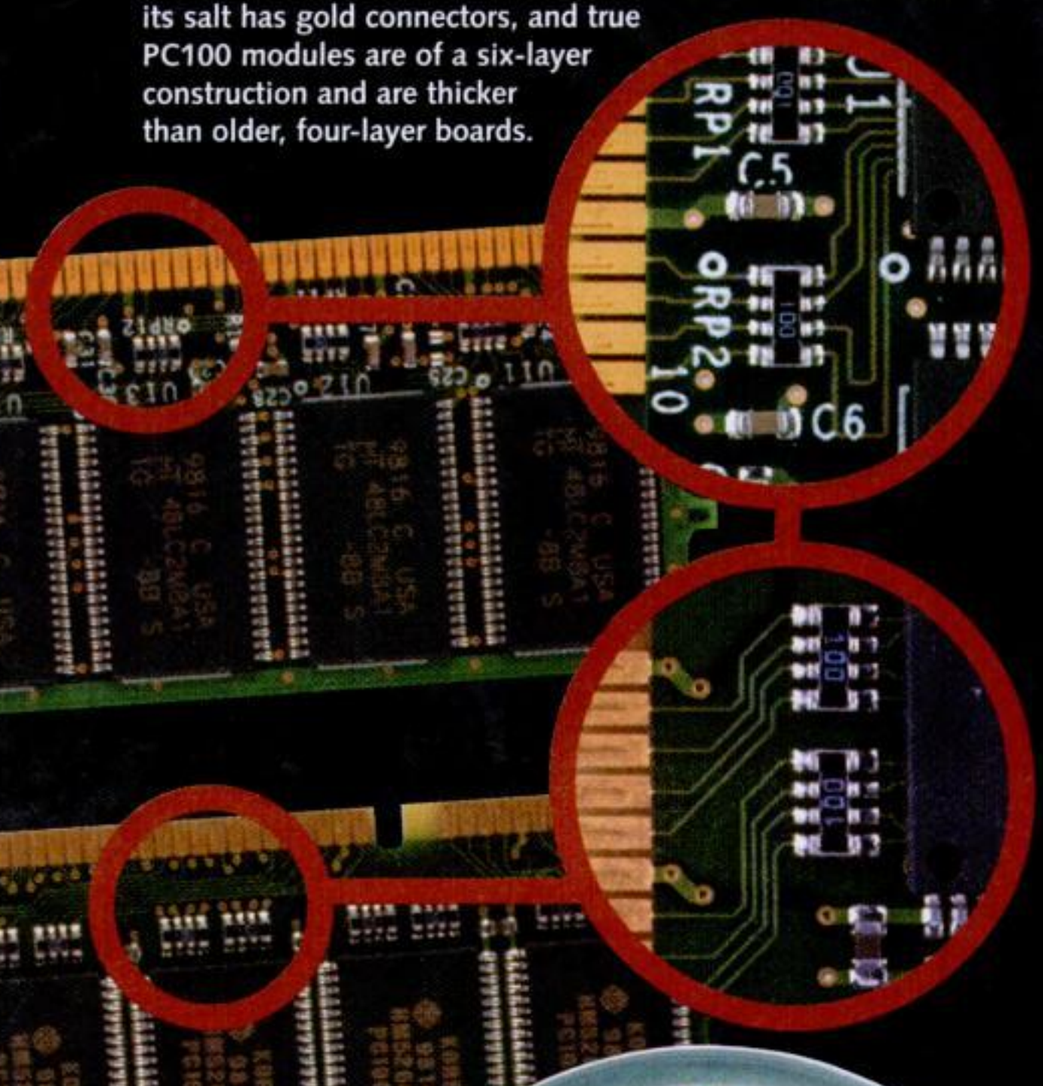
FACT COUNTERFEIT HARDWARE IN YOUR COMPUTER CAN MALFUNCTION, OVERHEAT, AND BE THE ROOT OF YOUR MYSTERIOUS CRASHES.

Others frauds are bolder, say, openly displaying cratefuls of counterfeit mice and selling them for $3 less than the guy next door. The mice are just cheap enough to attract your business, but not cheap enough to set off alarms. Although your corner PC shop may intentionally make a mark out of you—they know they can't buy $200 software for $20—they're more likely to be victims, too. Once someone has reported the fake product to authorities, they're out the money they spent on the original purchase and face a fine.

54▶

The truth is in the Serial Presence Detect, or SPD. This EPROM chip acts as the license plate of your RAM, telling the computer what timings to use. Using the DIMM_ID program (located at www.vml.co.uk), you can identify your memory's manufacturer, its serial number, and whether it's PC66 or PC100.

A properly designed PC100 module might have odd trace patterns. Thus, instead of the relatively straight traces pictured in the bottom example, a PC100 module's traces might take a few odd turns, as illustrated in the top example. This ensures the trace lengths are to spec and the manufacturer simply isn't following the path of least resistance. Also, any DIMM worth its salt has gold connectors, and true PC100 modules are of a six-layer construction and are thicker than older, four-layer boards.



Check your chip markings to see if they've been altered. Chip manufacturers are proud of their work and label them clearly (both examples here are unaltered, though many counterfeiters will remark the memory itself). Lettering should be clear. Also check the RAM manufacturer's web page. The majority post specs on the memory, which you can reference by serial number. The RAM on the left is made by Crucial and is spec'd to run down to 8ns, the recommended speed for real PC100. The Hitachi memory (right) was sold as 8ns, even though it really isn't.

CASE 003: PC100 RAM

Just because your memory works, it doesn't mean it's working up to spec. 66MHz memory that's been remarked as PC100 won't perform reliably on any system with a 100MHz system bus. Sadly, many a consumer has bought "PC100" memory in anticipation of a system bus upgrade, only to later discover they've been had.

Copyrighted material

PC-DVD™ Encore 6X can run all of your favorite

movies.

multimedia applications and do

movies.

everything your CD-ROM drive does.

movies.

And, by the way, did we mention it plays movies?

Turn Your PC Into An Entertainment Machine! Ask anyone and they'll tell you PC-DVD™ Encore 6X is a better way to watch movies. And they're right. Because DVD movies use digital technology so you experience every action, every sound, and every color. But PC-DVD™ isn't just about movies. With PC-DVD™ Encore 6X, you can use all your existing CD's — because Encore looks, works, and acts just like a CD-ROM drive. It runs your multimedia applications, plays audio CD's, and accesses encyclopedias. PC-DVD™ Encore 6X also allows you to access 17 gigabytes of information — that's 25 times more than a CD-ROM. With all that extra space, you get more words, more action, more video, and more sound. Just add popcorn.

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PC MAGAZINE EDITORS' CHOICE

WINLIST Windows Magazine 1998

CREATIVE®

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Awards shown are for PC-DVD™ 5X with Dxr™2 technology.

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The counterfeiter's most alluring target is Intel's venerable Pentium II chip. Its high price has made it a sweet skim for re-markers who alter the cartridges of slower CPUs and resell them as faster procs (and sometimes the units are even rigged to allow bus overclocking). Here's a few tricks you can try to identify a fakie.

CASE 004: PENTIUM II

The gap between the "u" and the "m" in the Pentium logo on the right is wider than the one between David Letterman's front teeth. Intel doesn't spend millions on logo design to have someone guff it up. Also, on the cartridge on the right, notice the bad spacing on the word "processor": That final "r" should fall directly below the last stroke of the letter "m" above.

◀52

The web is the latest frontier for trafficking counterfeit software and hardware. Frauds can create a temporary online auction account, sell a few hundred bogus copies of Windows 98 and some fake CPUs, and then blow town before anyone's figured out the scam. The problem has become such a commonplace, Microsoft and other companies now patrol the web looking for counterfeit items.

MORE.REAL.THAN.REAL

How good are the fake copies? So good, even the most sophisticated users can be fooled. Our own editors had trouble differentiating the real from the imposters among the mice on pages 50 and 51. There have also been instances in which Microsoft investigators have found counterfeit software on the computers of the very police departments conducting fraud investigations.

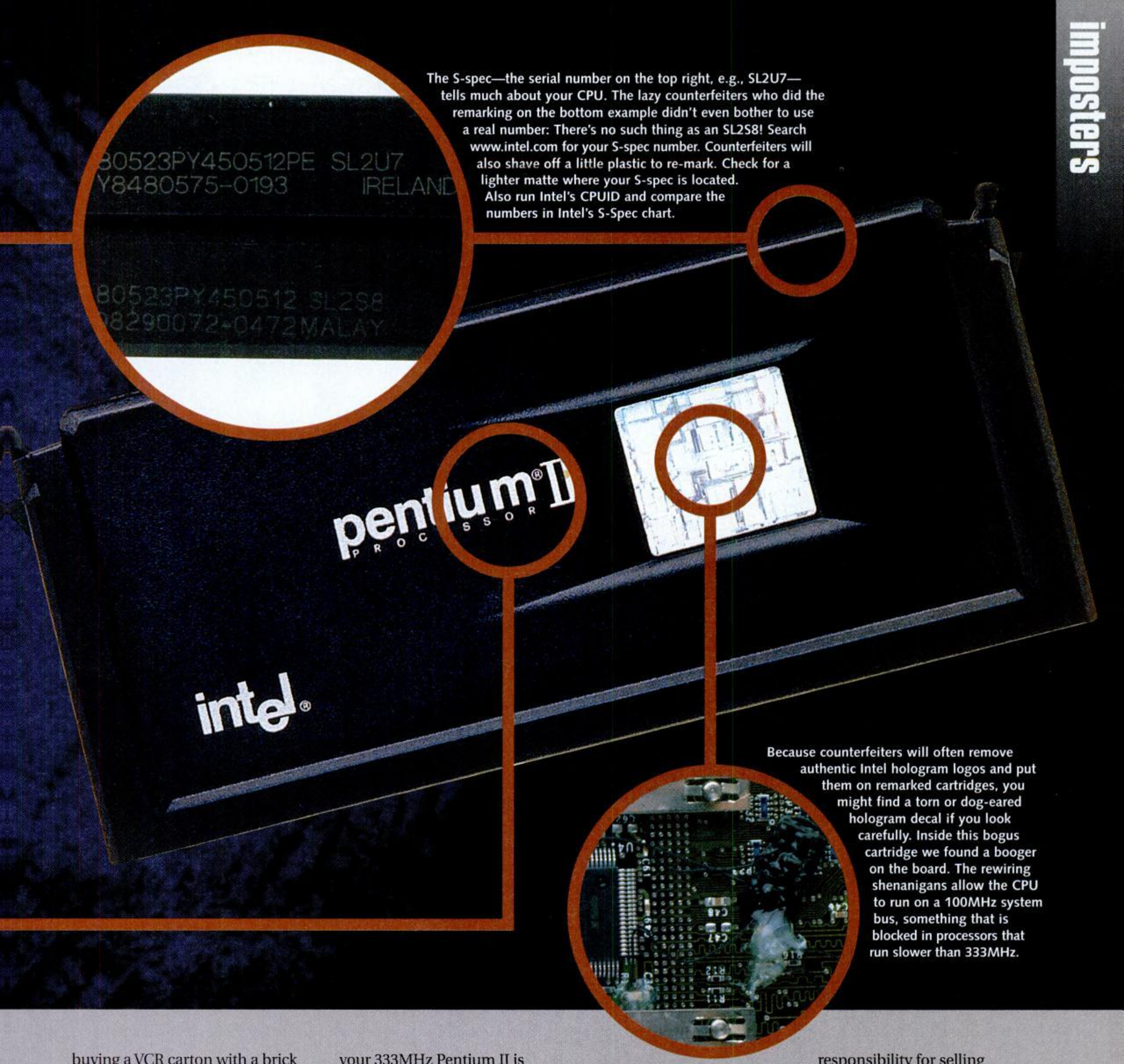
FACT NO HARDWARE OR SOFTWARE COMPANY IS RESPONSIBLE FOR HELPING YOU SHOULD YOU BE STUCK WITH COUNTERFEIT SOFTWARE.

Stop and look at your own mouse. The first "o" in Microsoft should have a notch in it. The "genuine" label on your Microsoft manual should change color when you touch it. What about your memory? You should query the Serial Presence Detect in your "real" PC100 RAM with the DIMM_ID utility. And make sure the serial number on your CPU is colored like the rest of the processor's markings.

Chances are you haven't done any of these tests, and even if you have, you'd be hard-pressed to find a sham. Careful examination of the images on these pages shows just how difficult it is to distinguish real products from rip-offs. A missing watermark here, a subtle shift in color there. The average consumer will never be able to spot a counterfeit without first looking at an authentic product for comparison.

YOU'RE.A.LOSER

Buying counterfeit computer goods can be just as bad as



The S-spec—the serial number on the top right, e.g., SL2U7—tells much about your CPU. The lazy counterfeiters who did the remarking on the bottom example didn't even bother to use a real number: There's no such thing as an SL2S8! Search www.intel.com for your S-spec number. Counterfeiters will also shave off a little plastic to re-mark. Check for a lighter matte where your S-spec is located. Also run Intel's CPUID and compare the numbers in Intel's S-Spec chart.

Because counterfeiters will often remove authentic Intel hologram logos and put them on remarked cartridges, you might find a torn or dog-eared hologram decal if you look carefully. Inside this bogus cartridge we found a booger on the board. The rewiring shenanigans allow the CPU to run on a 100MHz system bus, something that is blocked in processors that run slower than 333MHz.

buying a VCR carton with a brick inside of it from that shady guy on the corner. Some nightmare scenarios:

- Need tech support for your "legitimate" copy of *Office 97*? Forget it. You're the 513th person to call with that particular serial number.
- Need a warranty on a mouse that died after only one month? Sorry, you're out of luck.
- Finally decided to overclock that 400MHz Pentium II? No can do. It's already been overclocked to the max.
- Mysterious crashes? Maybe your 333MHz Pentium II is finally showing signs of age after running at an overclocked 400MHz unbeknownst to you.
- Ready to run your PC100 RAM at a full 100MHz on your new motherboard? Not a chance. You may have thought you purchased real PC100 RAM, but all you got was a lump of coal.

The risks vary with counterfeit software. Since counterfeiters don't worry about quality control, you might be facing CDs with bad sectors. Authorities have also found viruses on counterfeit discs and even beta code being sold as the real thing.

What recourse do you have? You'll get no real assistance from the companies that sell the original products. They might ask you for the "evidence" to help their own anti-counterfeiting efforts, but they won't help you get your money back. If you discover you've bought counterfeit goods, you should contact the reseller that sold them to you. The retailer bears responsibility for selling misrepresented products and perpetrating a fraud (but remember, the reseller may have been tricked, as well, and there's always the chance that you made a mistake in identifying the product). If you bought the product with a credit card that offers price, theft, and breakage protection, contact your credit card company.

In general, you should always be wary of prices that are too good to be true, and buy from trusted vendors that offer liberal return policies. Men in overcoats just don't sell authentic CPUs. ✹

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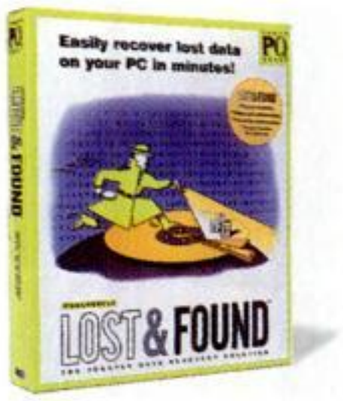

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notebook buffet

Are you hungry for some new mobile technology? Well, grab yourself a plate and mosey up to **Maximum PC**'s notebook buffet. We have all your favorite fixin's: fast processors, AGP graphics, and hungry-man-sized screens. We even have dishes for diet-conscious and discount diners, as well. And don't forget about our tasty side dishes. Remember, folks, it's all you can eat.

By Bryan Del Rizzo

PHOTOGRAPH BY JACK HUTCHESON

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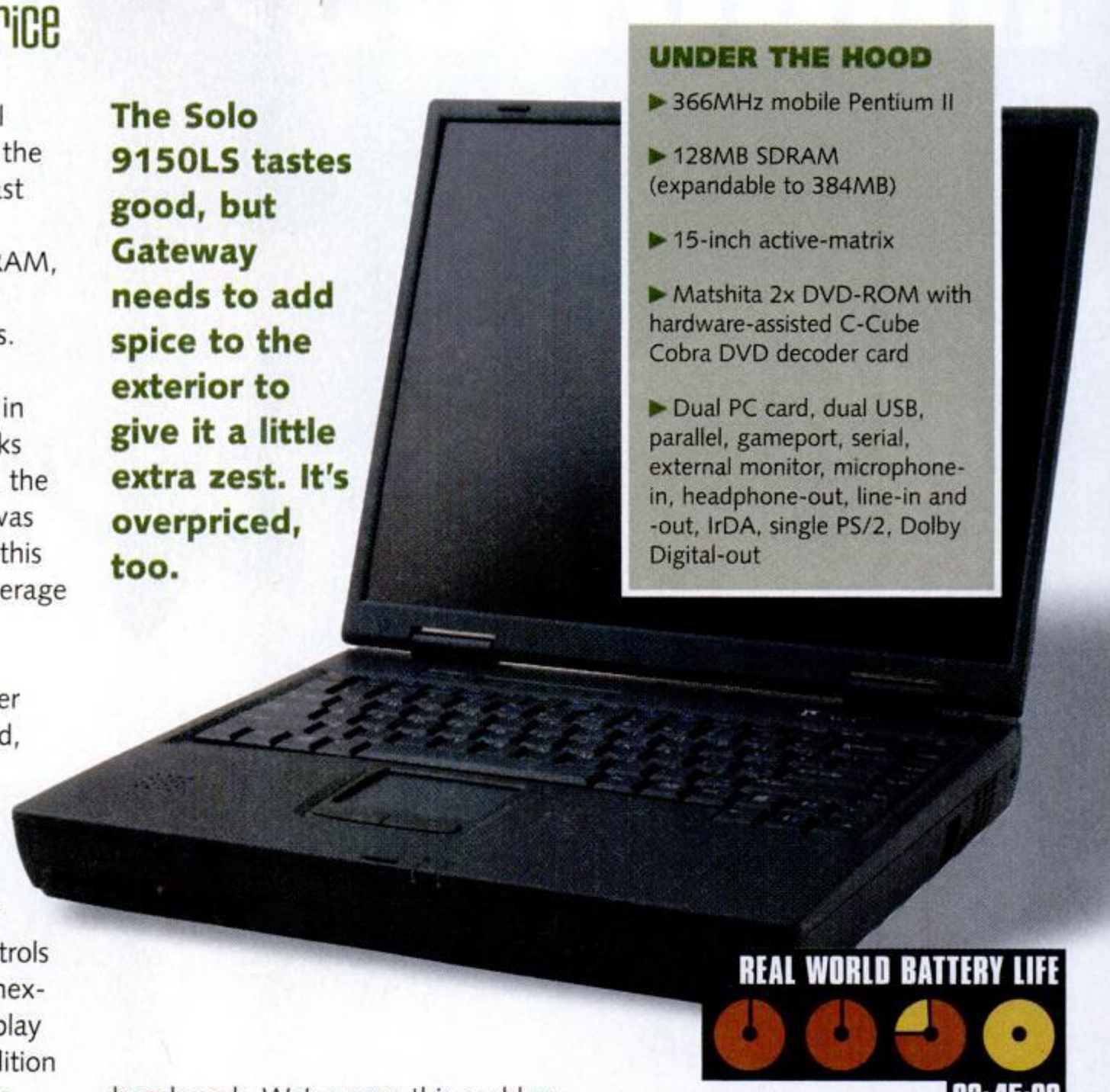
Gateway SOLO 9150LS

Fine dining at a high price

The Solo is tasty, but its bill will force you to pop an antacid at the end of the meal. With Intel's fast 366MHz Pentium II, a massive 15-inch display, 128MB of SGRAM, and a 2x DVD-ROM drive, the 9150LS tantalizes the tastebuds. Performance was solid, and the 9150LS consistently performed in the top-third of all the notebooks we've reviewed to date. In fact, the bundled 14GB IBM hard drive was the fastest notebook spinner in this roundup, clocking in with an average transfer rate of 9.09MB/sec.

The Solo 9150LS tastes good, but Gateway needs to add spice to the exterior to give it a little extra zest. It's overpriced, too.



UNDER THE HOOD

- 366MHz mobile Pentium II
- 128MB SDRAM (expandable to 384MB)
- 15-inch active-matrix
- Matshita 2x DVD-ROM with hardware-assisted C-Cube Cobra DVD decoder card
- Dual PC card, dual USB, parallel, gameport, serial, external monitor, microphone-in, headphone-out, line-in and -out, IrDA, single PS/2, Dolby Digital-out

PLUSES

- Solid performance
- Good DVD playback
- Video-in and -out

MINUSES

- Mundane design
- Sound-chip conflict
- High price
- DVD glitches

Gateway opted to include C-Cube's Cobra MPEG-2 decoder card. DVD playback looked good, and framerates held steady at 30fps with only minor artifacting. However, when viewing movies full-screen, an annoying white border popped up around the edges (fiddling with the controls didn't help). Also, for reasons unexplained, the 9150LS refused to play our dual-layered DVD special edition of *Young Frankenstein*, telling us "this disc is not formatted to play in this region," even though it was. Other discs ran fine, though. We also encountered a hardware conflict with the Crystal SoundFusion PCI sound chip when running the Forsaken benchmark. We've seen this problem on Gateway's desktop PCs before, but never on a notebook.

To our chagrin, the 9150LS's design is so mind-numbingly boring, we have to wonder whether aesthetics was even a consideration during development. The only colors on the entire unit—aside from black and gray—are the white and green in the Gateway logo. Yawn. And with nary a curve on the entire case, you'd think the Gateway engineers had never heard of a protractor. Gateway should turn to its bovine friends for some inspiration.

REAL WORLD BATTERY LIFE

The 9150LS will satiate your hunger for technology, and includes a free year of Internet service. But with a price tag that's $300 more than Micron's better-equipped TransPort NX, you'll have to put your pocketbook on a liquid-diet to afford it.

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD	163.7
WIN95 APPS	142
HARD DRIVE	9.09
CD-ROM	13x
3D RENDERING	573
DESKTOP PUBLISHING	85
DIRECT3D	37.57
SPREADSHEETS	177

MAXIMUM PC VERDICT

Price $4,074
Company Gateway
Phone 800.315.2536
URL www.gateway.com

8

▶ driver snafus

Of the six notebooks in this feature, four came with ATI's Rage LT Pro chipset—and each of the four had a different video-driver build. To test OpenGL *Quake II*, we installed the full version of *Quake II* version 3.19 and ATI's latest OpenGL ICD, build 1036 (none of the vendors thought to include it). Imagine our surprise when we discovered that the Gateway, the notebook with ATI's latest driver, performed roughly 31% slower than the rest of the pack.

ATI says there shouldn't have been any major performance discrepancies between Spadina, the latest driver, and version 5.xx. In fact, the only difference between the two versions is that Spadina uses a secondary display path to allow you to display images on two monitors. ATI hypothesized—incorrectly—that we were running a second display. At press time, ATI was still troubleshooting to find out why its latest drivers sucked.

Here's how all four ATI systems stacked up during testing.

For definitions of Terminator words, hyperlink to the back of *Maximum PC*, or check out the Terminator online at www.maximumpcmag.com.

Copyrighted material

CompUSA AmeriNote

Fully functional, but flavorless

CompUSA's AmeriNote has an identity crisis. It contains the latest and greatest PC technologies—a mobile 366MHz Pentium II, DVD-ROM drive, SuperDisk, and AGP graphics—but nothing else differentiates the notebook from the rest of the crowd.

Let's start with the design. Taking a cue from Gateway's trademark black-and-gray, squared-corner aesthetics, the AmeriNote is boring. The only smidgen of color comes courtesy of the yellow-green AC/battery indicators. With such a patriotic company name, we were hoping the AmeriNote would be emblazoned with red, white, and blue stripes.

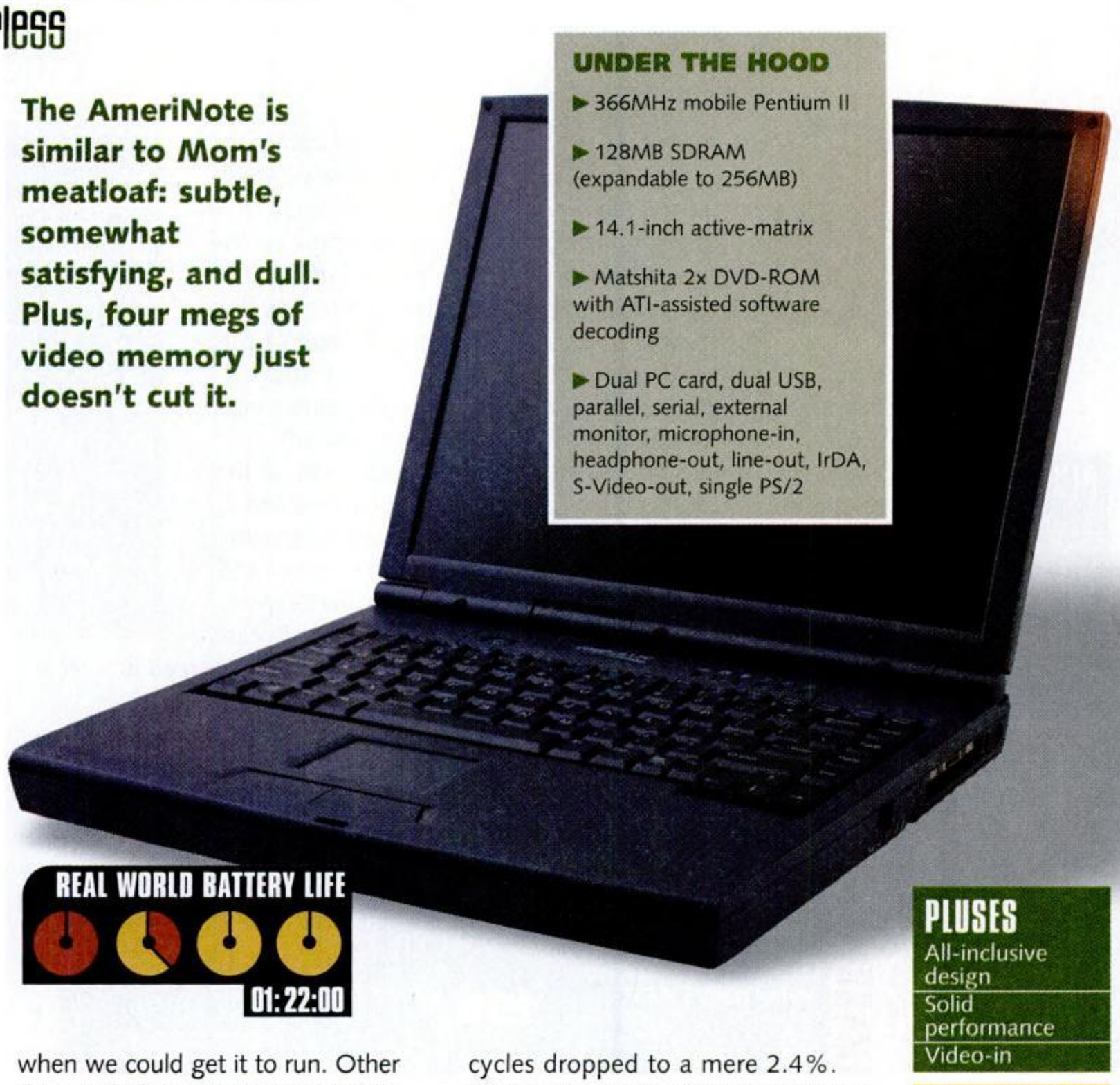
Next up, video. There's a D3D-compliant ATI Rage LT Pro chipset onboard, but CompUSA skimped by including a measly 4MB of SGRAM. If you've ever wondered how pathetic 4MB is for playing Direct3D games, witness this: The AmeriNote proffered only 9.71fps in *Forsaken*, compared to the 35fps+ on systems adorned with 8MB. Folks, if you're going to include a true D3D graphics chip, you have to blend in another 4MB of memory along with it.

We also ran into some problems while testing the quality of the DVD playback. Our test subject, *Young Frankenstein*, lurched incessantly—when we could get it to run. Other discs, including *Batman and Robin* and *Tomorrow Never Dies*, ran fine, but looked grainy.

CompUSA also committed a cardinal sin by not enabling DMA on either the hard drive or DVD-ROM drive. With the DMA turned off, the 6.4GB hard drive posted a transfer rate of 3.64MB/sec, consuming 98% of the CPU clock cycles in the process. With DMA turned on, however, the rate rose to 8.19MB/sec, while the CPU cycles dropped to a mere 2.4%. You do the math. Can you imagine being a newbie consumer and living with DMA turned off your whole life? It boggles the mind.

The AmeriNote itself is rather like a collapsed souffle—flat and uninspired.

The AmeriNote is similar to Mom's meatloaf: subtle, somewhat satisfying, and dull. Plus, four megs of video memory just doesn't cut it.



UNDER THE HOOD

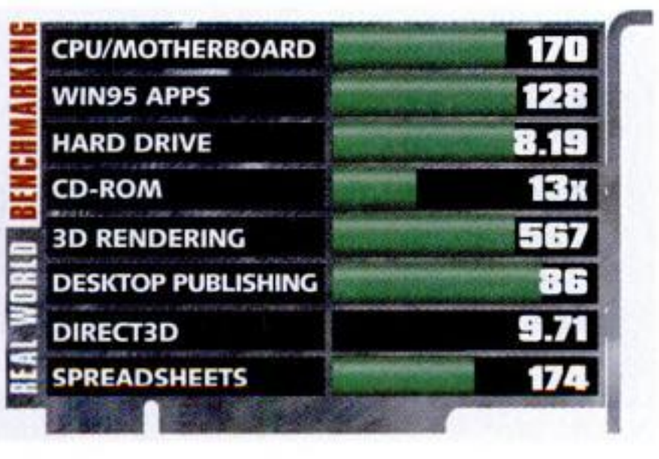
- 366MHz mobile Pentium II
- 128MB SDRAM (expandable to 256MB)
- 14.1-inch active-matrix
- Matshita 2x DVD-ROM with ATI-assisted software decoding
- Dual PC card, dual USB, parallel, serial, external monitor, microphone-in, headphone-out, line-out, IrDA, S-Video-out, single PS/2

PLUSES

- All-inclusive design
- Solid performance
- Video-in

MINUSES

- DMA not enabled
- Only 4MB video memory
- Short battery life



MAXIMUM PC VERDICT

Price $2,999
Company CompUSA PC
Phone 888.226.6772
URL www.compusapc.com

5

	GATEWAY	COMPUSA	MICRON	COMPAQ
Software Release Version	Spadina-B18	5.25-C51R	5.35.B57G	5.35.C57X
Driver Date	03-01-99	11-25-98	12-24-98	01-29-99
File Version	4.11.1007	4.10.2515	4.11.2544	4.11.2545
DVD Version	N/A	1.27-CP2	1.27A	N/A
Memory	8MB SGRAM	4MB SGRAM	8MB SGRAM	8MB SDRAM
I/O Base Address	e800h	e800h	d00h	e800h
OpenGL Quake II 640x480	15.8fps	24.1fps	24.2fps	20.8fps
OpenGL Quake II 800x600	12.3fps	17.0fps	17.3fps	17.9fps

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Micron TransPort NX

A well-done filet

MAXIMUM PC KICK-ASS! product

Like a carefully selected cut of beef seared over an open flame, the TransPort NX is about the closest thing you'll find to mouth-watering mobile perfection. Make no mistake, the NX is designed as a desktop replacement. Of course, with a 366MHz mobile Pentium II, AGP graphics, a 15-inch active-matrix display, dual pointing devices, and a 4x DVD-ROM drive, how could it be mistaken for anything else?

PLUSES
- Accessibility
- Dual pointing devices
- 4x DVD-ROM
- Record-setting performance
- Video-in and -out

MINUSES
- No built-in modem

In a burst of engineering genius, the TransPort NX includes a couple of flip-up panels that give you access to several normally off-limit components, including the memory modules and CMOS battery. The beauty of it? No screws! To gain access to the hard drive and future Mini PCI compartment (see sidebar), you only have to lift up two tabs on the front of the notebook and slide the bottom half of the keyboard (the portion containing the trackpad) forward. Lift up the keyboard behind it, and you're staring at the memory and CMOS battery—both of which can be upgraded or replaced in a New York minute.

If you want to plug in an additional battery or hard drive, you swap out the SuperDisk/floppy drive—not the more commonly optioned CD/DVD-ROM drive, which is fully integrated. This is good design logic: If you're taking a long intercontinental flight, you're more likely to use the DVD-ROM to watch a movie than swap floppy discs in and out. The hypnotic, sapphire power beacon, which can be seen from both sides of the LCD panel whenever the machine is powered up, in another attractive design touch.

UNDER THE HOOD
- 366MHz mobile Pentium II
- 128MB SDRAM (expandable to 384MB)
- 15-inch active-matrix
- Toshiba 4x DVD-ROM with ATI-assisted software decoding
- Dual PC card, single USB, parallel, gameport, serial, external monitor, microphone-in, headphone-out, line-in, IrDA, single PS/2, video-in and -out

Performance-wise, the TransPort NX kicks some serious butt. Its SYSmark score of 159 set a new notebook record, as did the 4x DVD-ROM drive that spun discs at 16.4x. Even the 24.2fps in 640x480 *GLQuake II* set a new record, as well. And the TransPort was also the only notebook capable of running the dual-layered *Young Frankenstein* DVD.

Except for the notebook's heavy 9lb. payload and the strange omission of the Win98 calculator and a built-in modem (a PC card version is included instead), the TransPort NX has it all.

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD bootMark	—	would not run*
WINDOWS APPS SYSmark 98	official score	159
HARD DRIVE HD Tach	MB/sec	9.04
CD-ROM CD Tach98	drive rating	16.4x
3D RENDERING Newtek Inspire3D	sec	571
DESKTOP PUBLISHING Adobe Photoshop 5.0	sec	83
DIRECT3D ForsakenMark	fps	37.6
SPREADSHEETS Microsoft Excel 97	fps	177

* Our pre-production model could not run the bootMark. Micron promises final production units will.

MAXIMUM PC VERDICT

Price $3,699
Company Micron
Phone 800.642.7667
URL www.micronpc.com

10

▶ A battery of battery tips

Aside from processor power, the single-most important element in a notebook is battery life. In the mobile world, there are really three types of batteries: Lithium Ion (Li-Ion), Nickel Cadmium (Ni-Cad), and Nickel Metal Hydride (NiMH).

Li-Ion batteries generally last longer, and are lighter in weight, but they're more expensive. Ni-Cads and NiMHs are used the most, and are relatively inexpensive. NiMHs take longer to recharge than Ni-Cads. Ni-Cads also suffer from "memory accumulation," which progressively limits the capacity of the battery with every recharge.

Of all the notebooks we've ever reviewed as PC journalists, almost all used Li-Ion batteries. The shortest time ever recorded for a notebook battery in our labs was a pathetic 37 minutes, which was held by Toshiba's original Libretto 50CT. To date, the longest was Micron's TransPort XKE, which lasted for an astonishing 3 hours, 21 minutes.

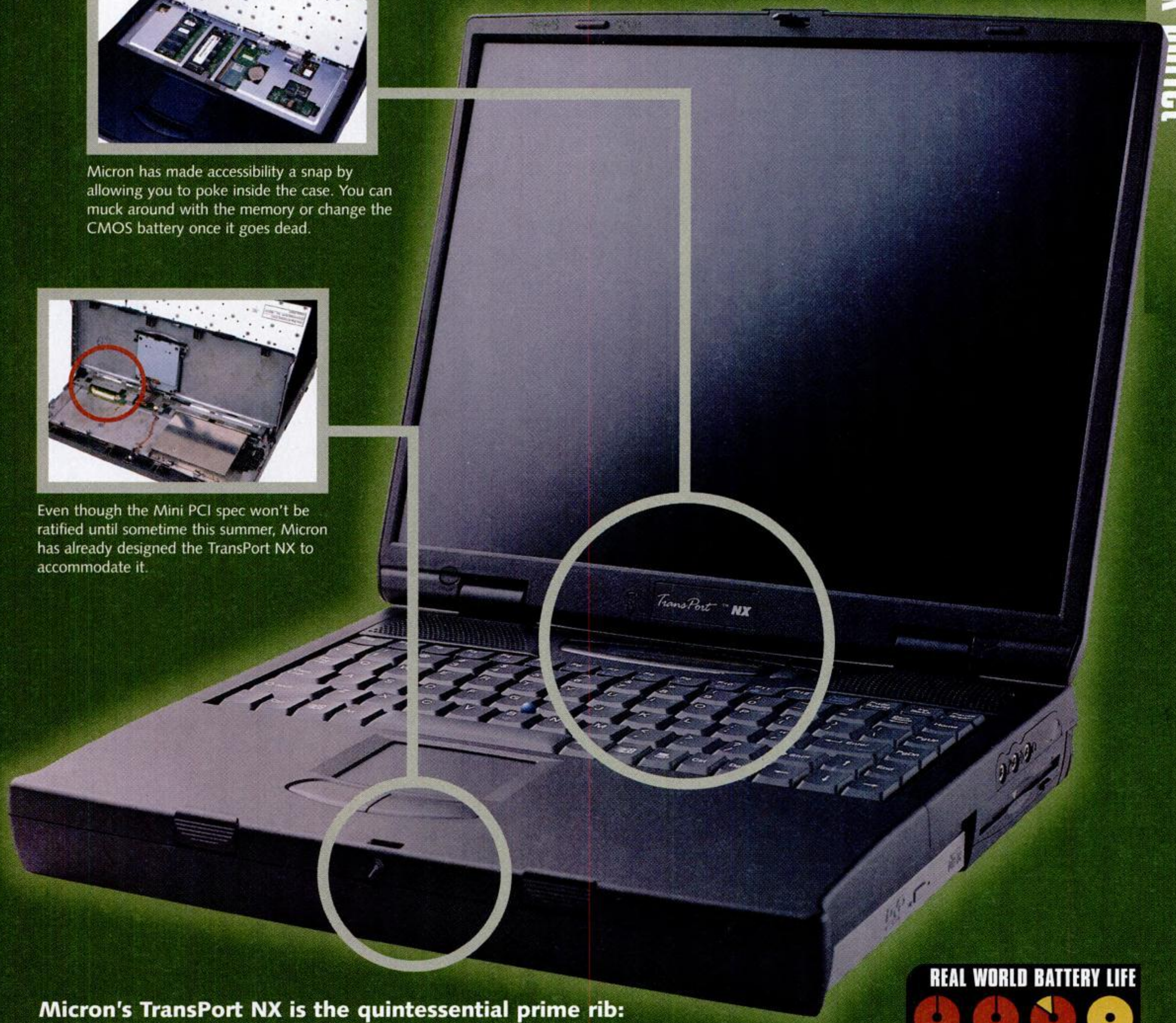
When shopping for a notebook, you should be wary of manufacturers' claims. If they say the battery will last three hours, you should cut that time in half, since you'll be using up the juice with real-world applications, and not running a benchmark. Here are some battery-saving tips:

▶ If you're planning on a long flight, pack an extra battery. Some first- and business-class seats are even

Copyrighted material

Micron has made accessibility a snap by allowing you to poke inside the case. You can muck around with the memory or change the CMOS battery once it goes dead.

Even though the Mini PCI spec won't be ratified until sometime this summer, Micron has already designed the TransPort NX to accommodate it.



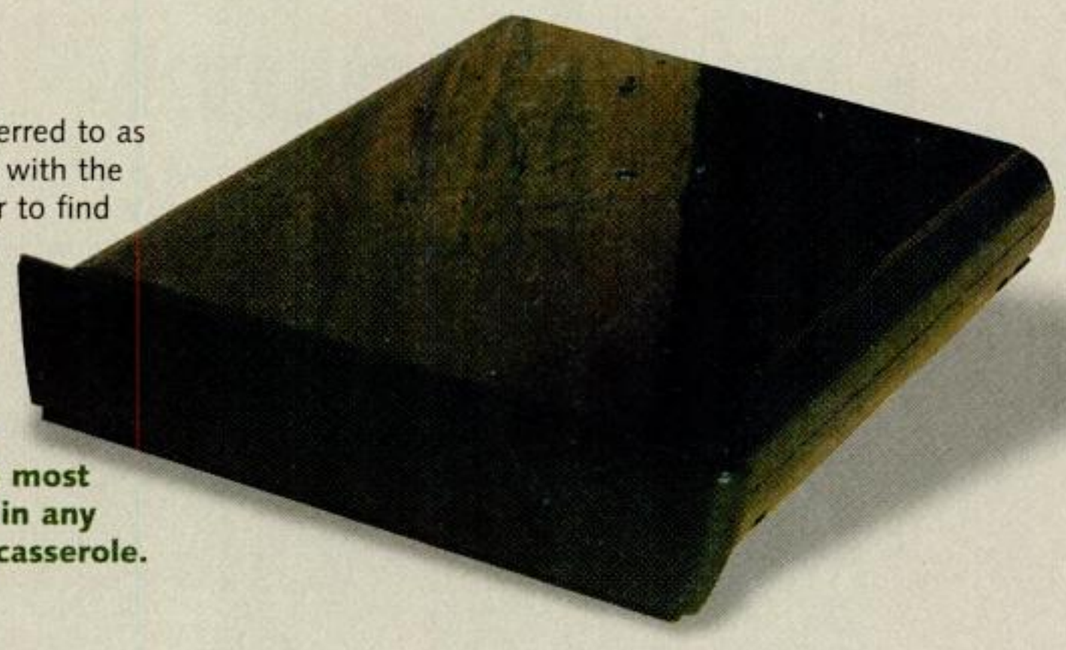
Micron's TransPort NX is the quintessential prime rib: it's tasty, loaded with flavor, and cooked to perfection.

equipped with armrests that'll allow you to charge the battery in-flight.

▶ DVD playback is the single-most life-sucking task you can perform. You might be able to use Microsoft *Word* for two to three hours on a single battery, but the minute you pop in a movie, the clock begins to tick.

▶ Many notebooks allow you to install a second battery, but force you to give up another key component, such as the CD-ROM drive. These swap-out slots are commonly referred to as expansion bays. Check with the notebook manufacturer to find out exactly what you'll be giving up to get extra battery life.

It may be as ugly as uncooked calf's liver, but the battery is the most important ingredient in any successful notebook casserole.



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Compaq Presario 1670

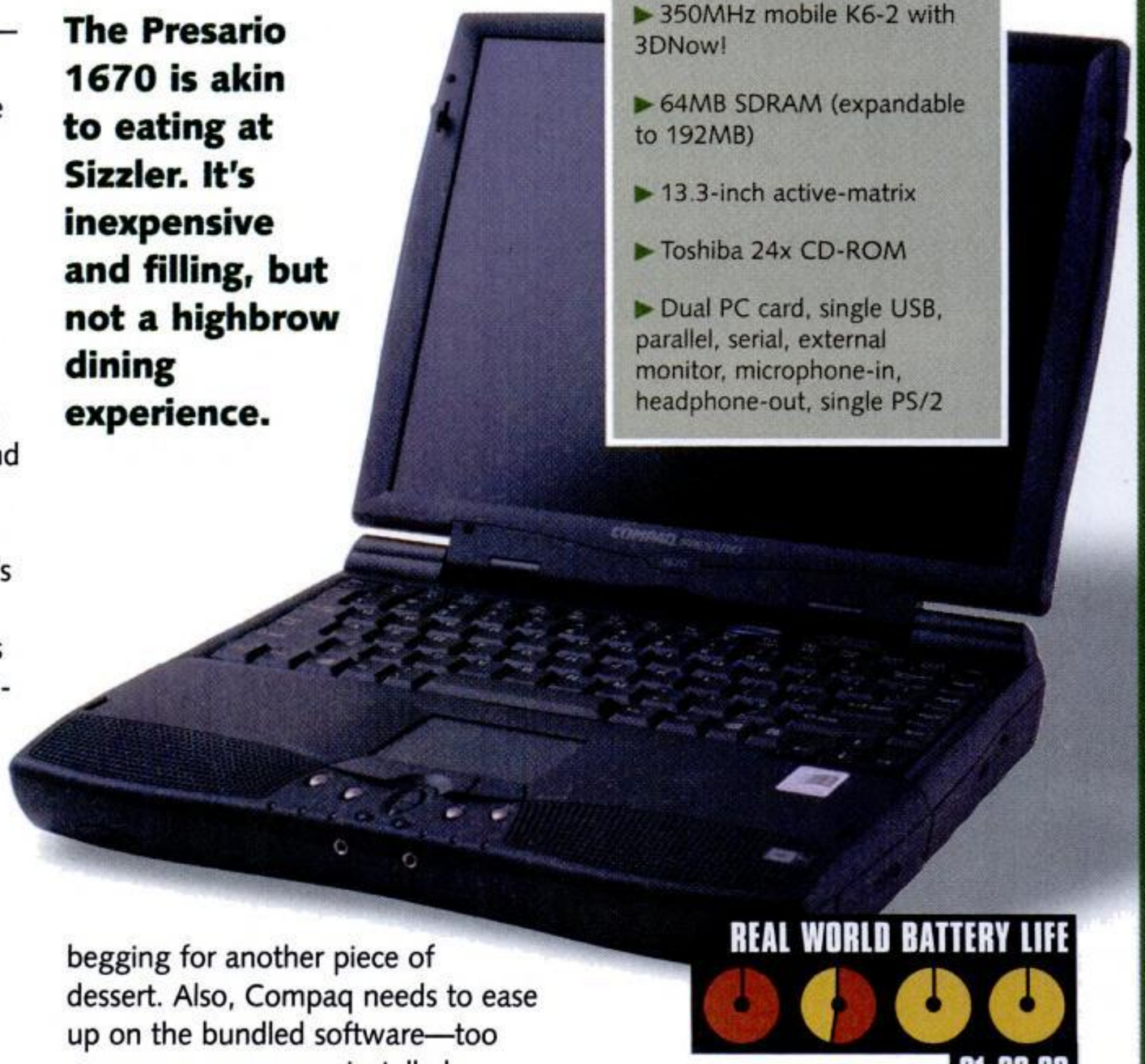
Tastes OK, less filling

The Presario 1670's main ingredient—AMD's 350MHz K6-2 processor—is bound to cause indigestion for those who prefer Intel's faster floating-point unit. However, with a price half that of top-choice Intel-based notebooks, the Presario 1670 isn't chopped liver either.

Nowhere is the K6-2's slow FPU more apparent than in our 3D rendering and imaging benchmarks—in these tests the Presario lagged behind the Intel-based notebooks by up to 50%. Although part of the slowdown can be attributed to the K6-2's FPU, a boost to system memory would ultimately help (the unit ships standard with only 64MB). In benchmarks, it's difficult to determine where the K6-2's 100MHz system bus factors in, but remember this: The K6-2 is clocked at 350MHz/100MHz, while the mobile Pentium II runs at 366MHz/66MHz. Unfortunately, a 380MHz/95MHz flava' K6-2 wasn't available in time for this review.

FPU issues aside, the only other slightly distasteful things were the chintzy 4.3GB hard drive capacity and lack of a DVD-ROM drive, which isn't even available as an option. The 24x CD-ROM spun discs at 13.8x and whined worse than a child

The Presario 1670 is akin to eating at Sizzler. It's inexpensive and filling, but not a highbrow dining experience.

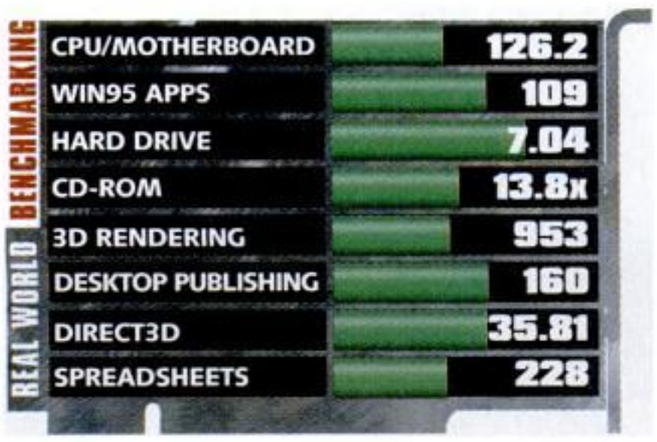


UNDER THE HOOD

- 350MHz mobile K6-2 with 3DNow!
- 64MB SDRAM (expandable to 192MB)
- 13.3-inch active-matrix
- Toshiba 24x CD-ROM
- Dual PC card, single USB, parallel, serial, external monitor, microphone-in, headphone-out, single PS/2

PLUSES
- Great price
- Nice design
- Cool speakers

MINUSES
- Slower performance
- No DVD option
- Software overload
- Short battery life



begging for another piece of dessert. Also, Compaq needs to ease up on the bundled software—too many apps come pre-installed, bogging down that hard drive.

Like a slice of homemade apple pie, the Presario 1670 comes equipped with a few tasty à la modes. ATI's 8MB Rage LT Pro chipset was juicy enough to power 800x600 *GL Quake II* to the highest framerates we've seen on a notebook. Factor in AMD's 3DNow! extensions and support for A3D positional sound, and the Presario 1670 easily doubles as a gaming machine. Other treats include hotkeys providing one-button access to Internet functions; scroll-up and -down mouse buttons; a rubberized coating that's cool to touch; and a pair of JBL-powered ported speakers.

It may not be the fastest notebook around, but the Presario 1670 is still a budget gourmet's delight.

MAXIMUM PC VERDICT

Price $1,999
Company Compaq
Phone 800.888.0220
URL www.compaq.com

8

▶ Mini PCI: Let's Get Small

The PC industry is close to adopting a new specification that aims to replace the bulky PC card interface with something a little more palatable and useful.

The new standard—dubbed Mini PCI—is described by a small formfactor card that rides the 32-bit PCI local bus (*see Micron review on p.60*) for high performance in smaller systems, such as notebooks and set-top boxes. Since these new cards will be removable, users will easily be able to swap them out for newer or upgraded technologies, and use them on a variety of platforms. The smaller size enables a higher level of system integration, and the new cards will be fully compatible with existing software and drivers.

Unfortunately, since Mini PCI's primary focus is to provide an interface for communication devices such as GPS, modem, and LAN cards, a Mini PCI-based Voodoo^3 card isn't likely.

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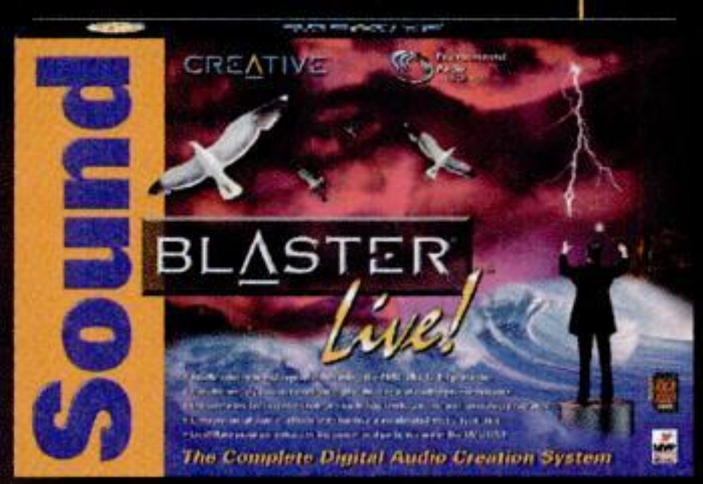
When it comes to digital PC audio, forget the zeroes...



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SONY VAIO 190

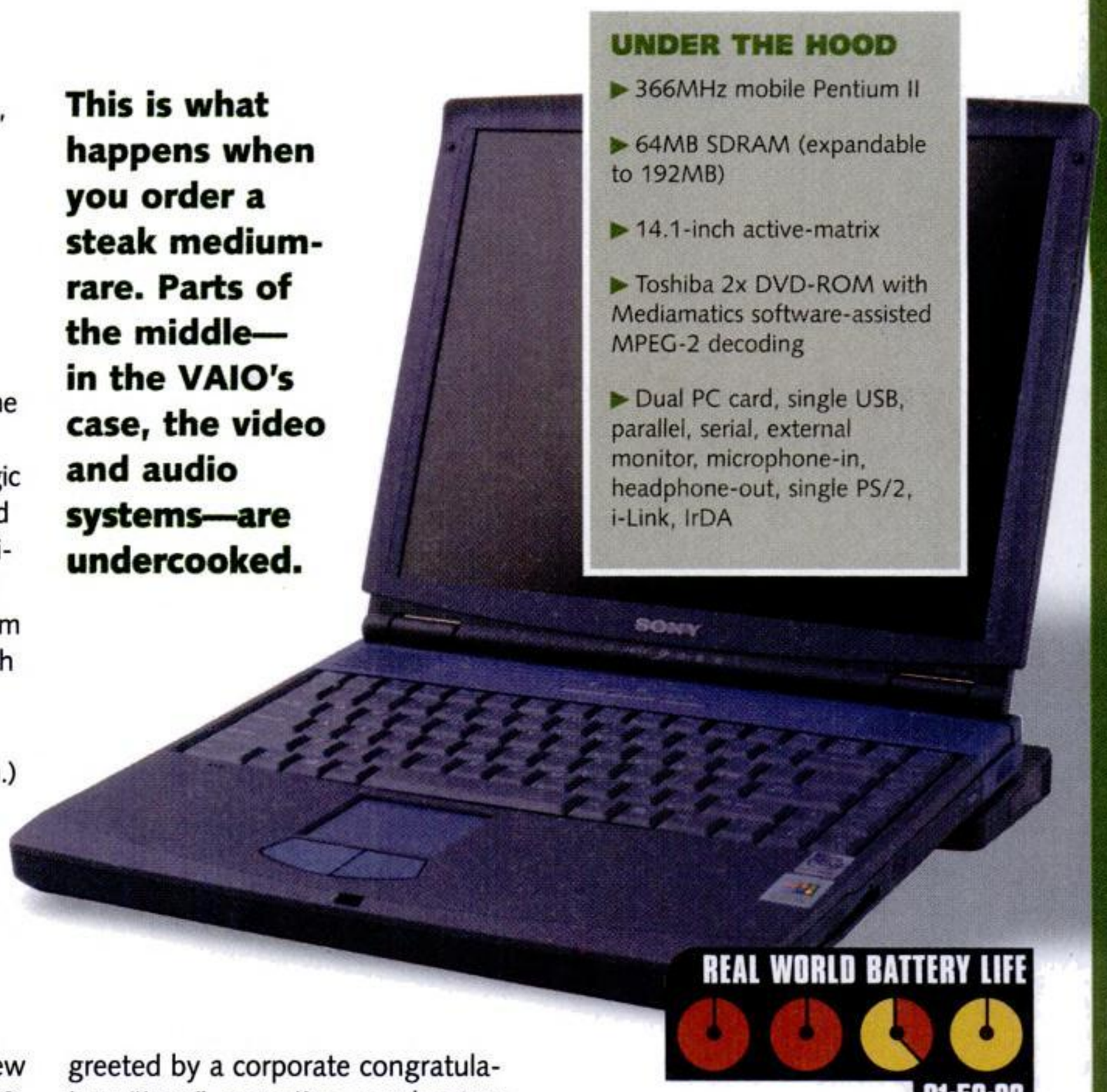
Food-court fare

Thanks to its two-tone color palette, subtle texturing, and rounded corners, the VAIO 190 looks absolutely delectable. But like a good steak that's still raw in the middle, the VAIO 190 has a few problems that can't be overlooked.

For starters, with Sony's audio-video-DVD pedigree, you'd expect the VAIO 190 to have a top-of-the-line graphics processor—but the NeoMagic MagicGraph 256AV AGP chip is a sad place-holder. It isn't Direct3D compliant, and it ships with only 2.5MB of video memory, resulting in a maximum external resolution of 1280x1024 with 256 colors. (In comparison, the ATI Rage LT Pro can drive a CRT to 1600x1200 with a 32-bit color depth.) And with Sony's music background, you'd expect a robust audio system, but the software-based wavetable sounds barely better than an early-80s FM-synth card.

Sony also comes in a close second—just behind Compaq—in cluttering up the desktop. The review unit we received contained about 30 sub-menus on the Win98 program bar alone. Worse, there's a lot of redundancy, including sub-navs for "online services" and separate listings for *AOL*, *Netscape*, and *Internet Explorer*. Worse yet, you'll be greeted by a corporate congratulatory "tour" every time you boot up the machine, until you delete it from a pre-set hotkey.

This is what happens when you order a steak medium-rare. Parts of the middle—in the VAIO's case, the video and audio systems—are undercooked.

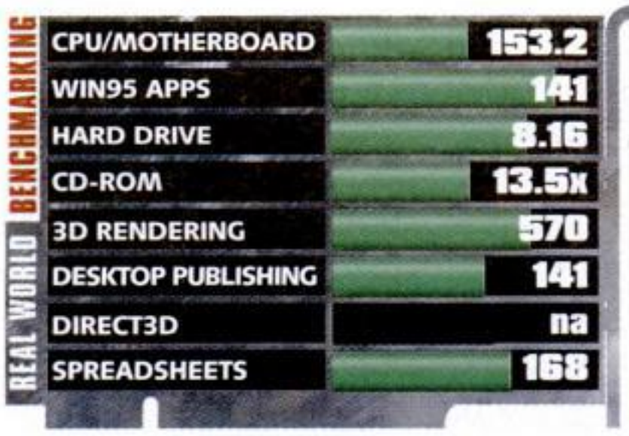


UNDER THE HOOD

- 366MHz mobile Pentium II
- 64MB SDRAM (expandable to 192MB)
- 14.1-inch active-matrix
- Toshiba 2x DVD-ROM with Mediamatics software-assisted MPEG-2 decoding
- Dual PC card, single USB, parallel, serial, external monitor, microphone-in, headphone-out, single PS/2, i-Link, IrDA

PLUSES
- Cool colors
- IEEE 1394-in
- Good performance

MINUSES
- No D3D support
- Lousy wavetable sound
- Cluttered desktop
- No video-out



The VAIO 190 includes an i-Link digital video interface, programmable macro keys, and a flurry of accessories including long-life batteries and a docking station. A mere 64MB SDRAM comes standard.

Aesthetics notwithstanding, the VAIO 190 just didn't satisfy our mobile craving.

MAXIMUM PC VERDICT

Price $3,100 ($200 for docking station shown)
Company Sony PC
Phone 800.888.0220
URL www.sony.com

6

▶ How to annoy the person sitting next to you

▶ Play Microsoft *Flight Simulator*, charting the exact course you're actually flying. Then mid-way into the flight, scream, "Oh my God, the plane is going to crash!" Then crash the plane.

▶ Watch the extended DVD-version of *The Exorcist*. If you're sitting next to a nun, apologize and tell her you'll put in *Sister Act II*. But then just keeping watching *The Exorcist*.

▶ Conveniently forget to plug in your headphones while playing *Quake II*, and then pretend you can't hear the complaints over the roar of the engines. Every time you kill an alien robot, kick the seat in front of you and whisper, "That one was for you, Jimmy."

▶ Alter your desktop screen so it reads "Bomb Activated. Countdown Commencing". Now leave it sitting on your food tray while you go to the bathroom.

▶ If you're sitting in an aisle seat, offer to play a round of Jeopardy or Wheel of Fortune with the person sitting in the window seat. Then ignore the poor sap sitting in the middle.

▶ Bore your neighbor with a 45-minute slideshow of your family trip to the Grand Canyon, and then grandly announce, "And here's some private pics from my Bangkok sex tour!"

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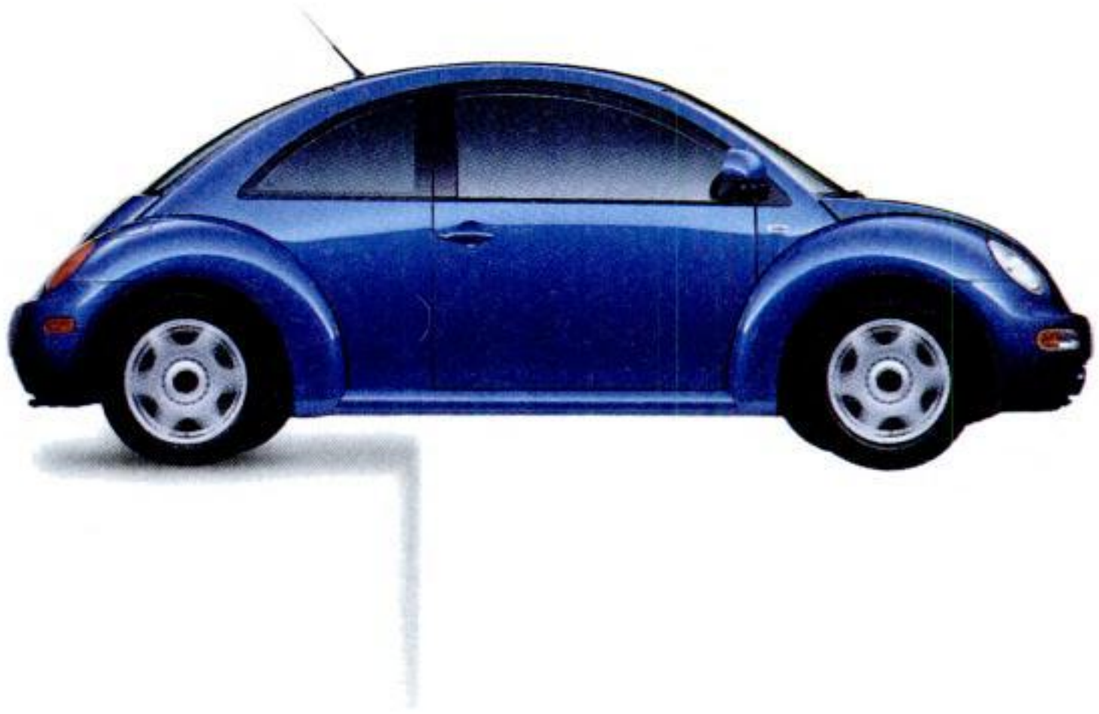
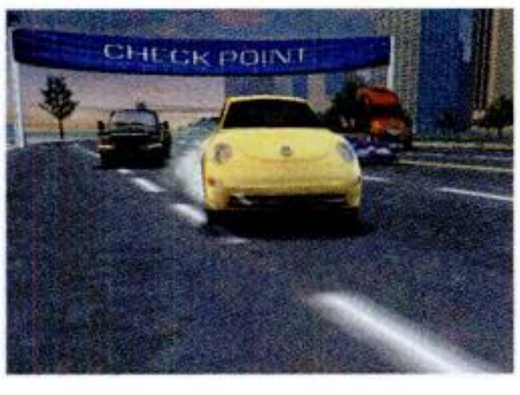
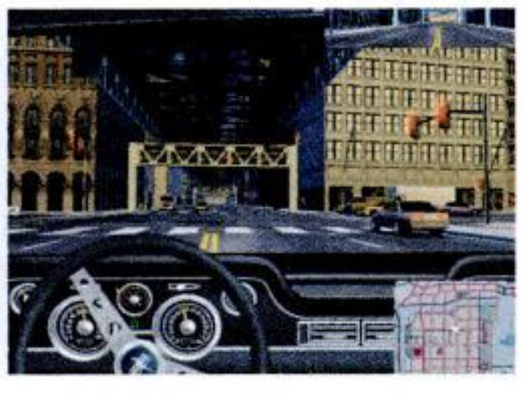


0-60 (off a skyscraper)? Yes.

Racers, start your mayhem. Grab hold of one of 10 wild vehicles and race through the windy streets of Chicago, where you'll have to deal with tough opponents, alleyways, drawbridges, newspaper racks, tunnels, and the police. Throw in five race modes and over 50 city landmarks, and there are plenty of sights to see. Just don't drive like a tourist.





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Microsoft

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Acer TravelMate 332T

Diet-sized annoyance

The first thing you'll notice about the TravelMate 332T is that it's thin. Frankly, we were amazed that a mobile 366MHz Pentium II, 64MB SDRAM, and a V.90 modem were stuffed inside the very cool, two-toned, silver shell. But shuck the shell and you're left with a notebook that comes saddled with some very addled features.

With its problematic, external CD-ROM/floppy combo and idiosyncrasies, the TravelMate is as appetizing as a bowl of tripe.

With a height of only three inches, the TravelMate 332T couldn't possibly incorporate a built-in CD-ROM or floppy drive. Hence, all CD-ROM and floppy action must be external—and the external flava didn't even work consistently! Whenever we tried to access a disc—CD or floppy—we were permitted one access, and then the system would vomit in frustration, forcing us to remove the battery and AC adapter in order to reboot. So maybe we had a bum unit. Acer sent a replacement, but the second one didn't work either. We had to connect one of Backpack's external, parallel port CD-ROMs just to run our benchmarks, but even then, the machine hiccuped every time we attempted to run SYSmark 98.

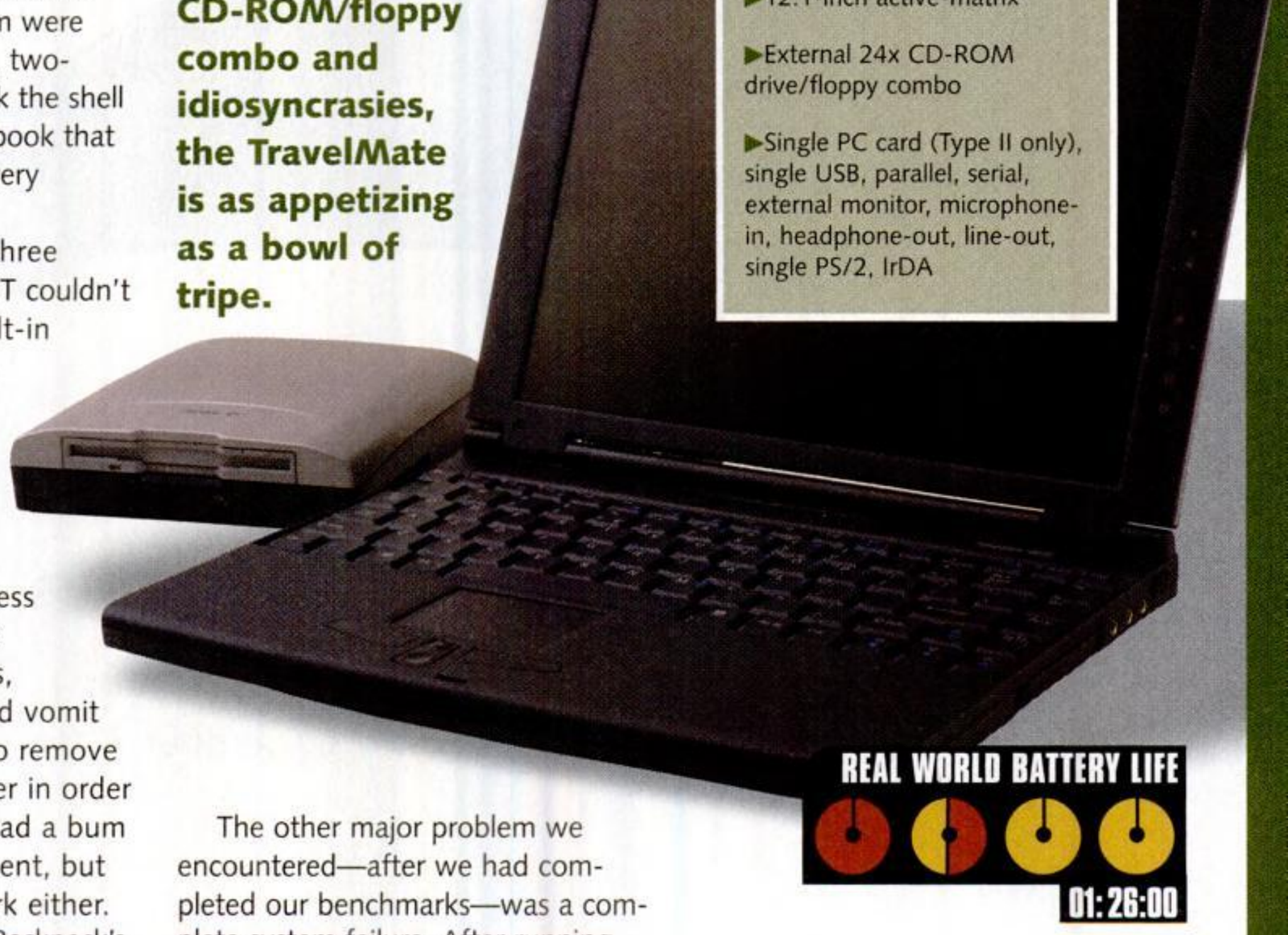
PLUSES
- 366MHz Pentium II
- Slim design
- Two-tone color

MINUSES
- Problematic CD-ROM/ floppy combo
- Lackluster audio
- No D3D support
- Short battery life

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD	151.2
WIN95 APPS	would not run
HARD DRIVE	8.19
CD-ROM	12.9x
3D RENDERING	595
DESKTOP PUBLISHING	141
DIRECT3D	na
SPREADSHEETS	192

UNDER THE HOOD
- ▶366MHz mobile Pentium II
- ▶64MB SDRAM (expandable to 256MB)
- ▶12.1-inch active-matrix
- ▶External 24x CD-ROM drive/floppy combo
- ▶Single PC card (Type II only), single USB, parallel, serial, external monitor, microphone-in, headphone-out, line-out, single PS/2, IrDA



REAL WORLD BATTERY LIFE

The other major problem we encountered—after we had completed our benchmarks—was a complete system failure. After running the battery power down to check battery life, the system refused to boot into Windows. No safe mode, no prompts, no nothing. It didn't matter if we were running on AC or battery power, the only thing that booted was a blue screen of death and a stuck cursor.

These problems are a shame, because the TravelMate 332T has a lot of potential. The design is compelling, and with a fast mobile processor—the benchmarks back this up—it definitely has the power to compete in the sub-notebook category. Unfortunately, our experiences with this review unit lead us to believe that some re-engineering work is in order.

The TravelMate 332T looks delectable, but this particular model left a bitter aftertaste.

MAXIMUM PC VERDICT

Price $2,699
Company Acer
Phone 800.733.2237
URL www.acer.com

4

▶ Games on the run

There's no "perfect" game to play on a notebook, but if you're looking for something to kill time on a flight to Madagascar, consider this:

▶ Avoid games that tax the battery. Unless you can charge your notebook in mid-air, look for games that can be stored completely on the hard-drive. That way, you won't have to load off the CD-ROM, wasting precious power and time.
▶ Be aware of graphics requirements. Some games require D3D-compliant chipsets. Voodoo-only games are out of the question.
▶ Unless you can play with a keyboard, don't bother. You won't want to lug around a gamepad or flight stick. Besides, most notebooks don't include an actual gameport (though USB might soon solve the gameport issue).
▶ Whatever you play, make sure you bring a pair of headphones.

Here are our picks for the best five games to play on a plane:

1. Quake II. Looks great on an LCD. Runs great in OpenGL

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dare to compare

When considering what notebook to purchase, don't be swayed by manufacturers' claims, specs, or promises. Because so many vendors now offer "build-to-order" paradigms, the price and features quoted may not end up in the notebook you take home.

Always double-check the video subsystem configuration and find out whether the chip is D3D-compliant. Many spec sheets and technical support provide accurate information, but some don't. If in doubt, double- or triple-check to make sure.

Memory is always good. If you can't afford 128MB (or more), make sure upgrading won't be a problem. You don't want to have to send it back to perform a simple upgrade.

Even though you might not need it now, find out if a docking station is offered as an option. You might find it useful at a later date.

Finally, decide on what applications you'll be running before you decide on what notebook to buy. If all you're doing is word processing and e-mail, you probably don't have to plunk down a few thousand for the privilege of working on the road. If gaming's important, go for one with a D3D-compliant chip. If DVD's your cup of tea, buy a notebook with TV-out and a good pair of speakers. If weight is a factor, make sure you consider all of the accessories that you might have to lug around the airport.

FEATURE	ACER TRAVELMATE	SONY VAIO 190	GATEWAY SOLO 9150LS	COMPAQ PRESARIO 1670	COMPUSA AMERINOTE	MICRON TRANSPORT NX
Processor	366MHz P-II	366MHz P-II	366MHz P-II	350MHz K6-2	366MHz P-II	366MHz P-II
Memory	64MB SDRAM	128MB SDRAM	128MB SDRAM	64MB SDRAM	128MB SDRAM	128MB SDRAM
Screen Size	12.1 inches	14.1-inches	15 inches	13.3 inches	14.1 inches	15 inches
Maximum res	800x600	1024x768	1024x768	1024x768	1024x768	1024x768
Graphics controller	Trident Cyber9525 DVD	NeoMagic MagicMedia	ATI Rage LT Pro	ATI Rage LT Pro	ATI Rage LT Pro	ATI Rage LT Pro
Video memory	2.5MB VRAM	2.5MB VRAM	8MB SGRAM	8MB SDRAM	4MB SGRAM	8MB SGRAM
Direct3D-compliant?	No	No	Yes	Yes	Yes	Yes
Hard drive size	6.0GB	6.4GB	14GB	4.3GB	6.4GB	14GB
Hard drive transfer rate	8.19MB/sec	8.16MB/sec	9.09MB/sec	7.04MB/sec	8.19MB/sec	9.04MB/sec
CD-ROM performance speed	12.9x	13.5x	13x	13.8x	13x	16.4x
DVD?	No	Yes	Yes	No	Yes	Yes
Removable media	Floppy	Floppy	SuperDisk	Floppy	SuperDisk	SuperDisk
Coolest feature	Slim-line formfactor	Aesthetics	Free Internet Service for 1 Year	3DNow! on a notebook?!	All-inclusive design	Accessibility
Lamest feature	Problematic functionality	No D3D hardware	Boring aesthetics	Whiny CD-ROM	DMA not enabled	PC card modem
Core notebook weight	4 lbs, 2 oz.	7 lbs, 3 oz.	8 lbs, 13 oz.	7 lbs, 7 oz.	7 lbs, 7 oz.	8 lbs, 13 oz.
Battery life	1:26	1:59	2:45	1:33	1:22	2:50
Price	$2,699	$3,100	$4,074	$1,999	$2,999	$3,699
Verdict	4	6	8	8	5	10

mode with ATI's Rage LT Pro chipset. Works great with the keyboard.

2. Wheel of Fortune/Jeopardy. What's to tell? You know how to play. The answer is: "This 1970 disaster movie starred Jacqueline Bisset."

3. Outburst. This party game of verbal explosions sounds great through headphones and doesn't drain the battery. Plus, it's fun for the whole row.

4. Midway Arcade's Greatest Hits #2. Bring back old memories and waste hours in the airport playing such classics as *Moon Patrol*, *Root Beer Tapper*, and our personal fave, *BurgerTime*.

5. MAME Software Emulator. OK, so technically it isn't a game, and it might be illegal, but it's free. Plus, the games don't take up very much hard drive space.

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Hi-Val Hollywood+ RealMagic MPEG-2 Card Features

- High Definition "Movie Quality" Picture
- Dolby Digital AC-3 Surround Sound
- High Quality S-Video Output

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MAXIMUM PC KICK-ASS! product — DVD3 Kit January 1999

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PC GAMER EDITORS' CHOICE — DVD PC-to-TV Kit August 1998

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WINLIST 1998 — DVD3 Kit November 1998

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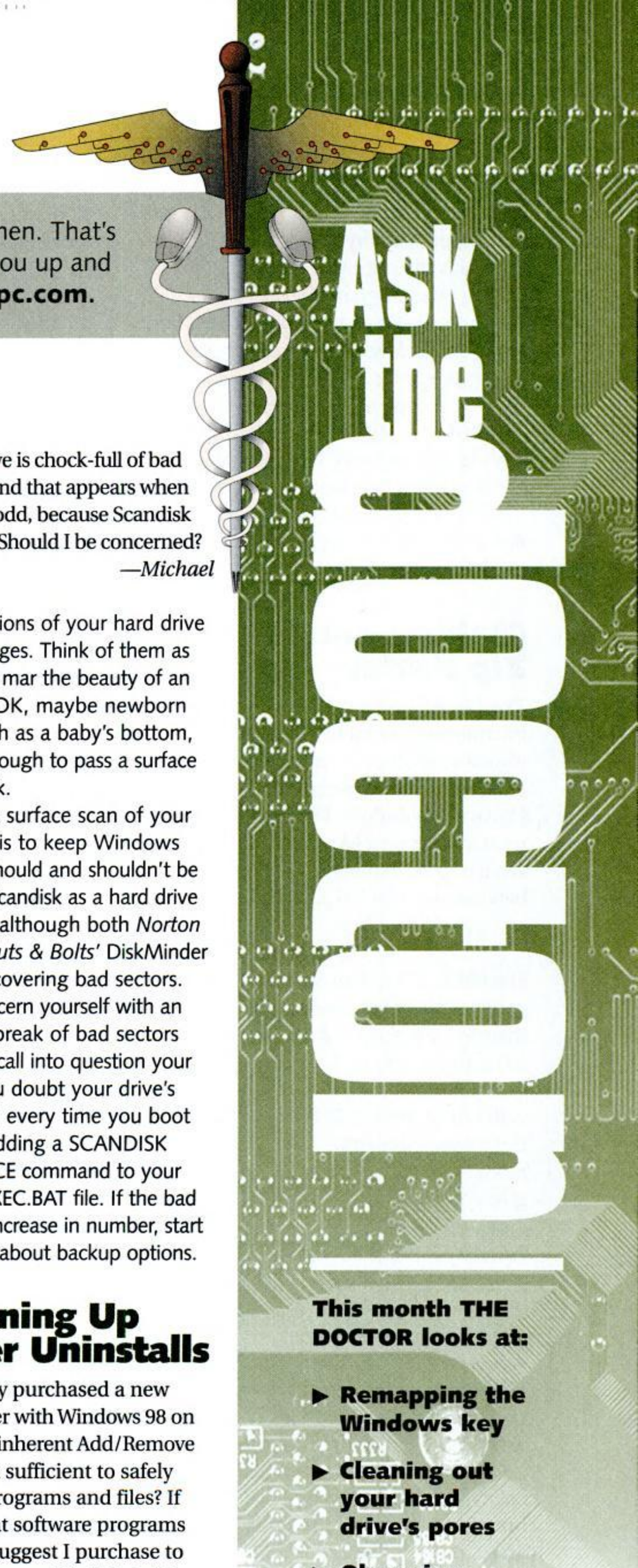

Flushing Out the Registry

What is the best way to clean up my registry? My Sony PCV-70 is a great machine that I want to keep for my kids, but when I scan the registry, I get references to software products and links that I removed a long time ago. Is *Norton Utilities* the only way to clean my registry?

—UgeneM

Microsoft Reg Clean
Windows Registry Analysis and Correction
RegClean is checking a part of your registry for errors. This will take several minutes. When it is finished, you may cancel and exit RegClean, or let it fix the errors it found. If you let RegClean fix the errors, it will generate an Undo file in the folder with RegClean. Double-click on this file to reverse the corrections RegClean makes.
Please report all bugs, suggestions and comments to regclean@microsoft.com
The RegClean Team
Scanning Class Identifiers for errors...
Start
Cancel

Microsoft's free RegClean utility searches the registry for common errors and cleans out bad values.

While *Norton Utilities'* excellent WinDoctor is an intuitive registry scanner that takes care of all the nitty gritties of your registry, you can always dig in yourself with one of Microsoft's free registry cleaners. Windows 98 ships with a simple DOS scanner (SCANREG) that backs up, restores, and fixes simple registry errors. It's definitely not as powerful as *Norton Utilities*, but it comes in handy when you can't start up due to a registry corruption. Just restart Windows to a DOS prompt and run SCANREG with the /FIX parameter to scrub out your registry.

Another free Microsoft tool called RegClean is specifically designed to clean out old unused registry entries. It's a Windows app that works like a registry enema—just load it up and flush it out.

> **"A free Microsoft tool called RegClean is specifically designed to clean out old unused registry entries. It's a Windows app that works like a registry enema—just load it up and flush it out."**

Just be careful what you're flushing, since there's no such thing as an undo command when editing the registry. Any changes you make take affect immediately. Make sure to back up the registry before making any permanent alterations.

Hard Drive Dermatology

My 10.2GB Seagate hard drive is chock-full of bad sectors according to the legend that appears when I run Win98's defrag. This is odd, because Scandisk doesn't show any problems. Should I be concerned?

—Michael

Bad sectors are flawed portions of your hard drive that develop as your drive ages. Think of them as wrinkles or pock marks that mar the beauty of an otherwise pristine platter. OK, maybe newborn hard drives aren't as smooth as a baby's bottom, but they should be clean enough to pass a surface scan with nary a black mark.

It's a good idea to run a surface scan of your hard drive on a regular basis to keep Windows up to date on where data should and shouldn't be written. You can even use Scandisk as a hard drive Alpha-Hydroxy treatment, although both *Norton Utilities'* Disk Doctor and *Nuts & Bolts'* DiskMinder do a much better job of recovering bad sectors.

While you shouldn't concern yourself with an occasional blemish, an outbreak of bad sectors should definitely make you call into question your hard drive's reliability. If you doubt your drive's integrity, try running a scan every time you boot up, by adding a SCANDISK /SURFACE command to your AUTOEXEC.BAT file. If the bad sectors increase in number, start thinking about backup options.

Cleaning Up After Uninstalls

I recently purchased a new computer with Windows 98 on it. Is the inherent Add/Remove Program sufficient to safely delete programs and files? If not, what software programs do you suggest I purchase to safely accomplish this task?

—J.Stewart

Although it's fine to use Add/Remove for most apps, most programs do leave tiny bits behind even after they've been "deleted." You can try any of the commercially available programs, such as Symantec (formerly Quarterdeck) *CleanSweep 4.5*. Keep in mind that you should have *CleanSweep* running in the background to

This month THE DOCTOR looks at:

- **Remapping the Windows key**
- **Cleaning out your hard drive's pores**
- **Obsessive-compulsive uninstalls**

and more...

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record the installation and changes when adding programs. I agree that it's annoying to have one more app in the background sucking up memory and system resources, but that's the price you pay for complete control over program uninstalls.

You may also want to simply do a fresh install of Windows 98 on occasion. Consider it spring cleaning for your machine. If you're running a copy of Windows 98 that was installed over Win95, which had been running for two years, it's probably getting a little ripe anyway. Make sure you have all the drivers you need handy, backed up your files, and written down your network settings before you wipe your Windows.

Making Your Zip Fatter

The Zip web site says that Iomega has no intention at present to produce a FAT32 format utility for the Zip drive, and they don't recommend using a third-party utility. I have two questions. First, can a Zip 100 be used to back up a FAT32 machine? Second, can it be used to transfer files and applications between a pair of FAT32 machines?

—Paul

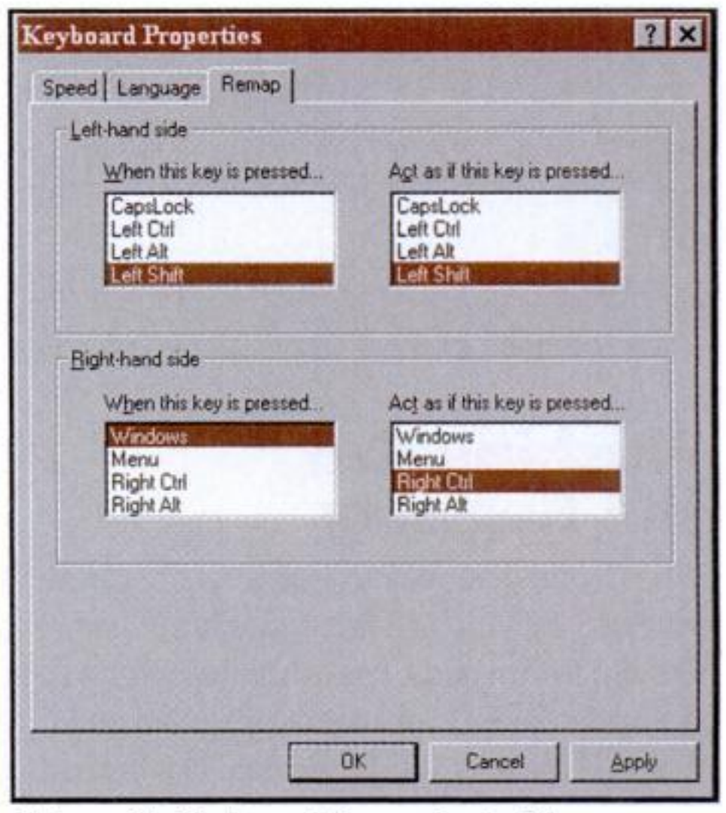
The FAT32 file system isn't designed for drives smaller than 512MB. Even if it were, there really isn't a need to format a Zip disk with FAT32, since FAT16 cluster sizes should be efficient enough not to give you too much slack on a 100MB disk. The advantages of FAT32 really come into play with large hard drives, since it uses smaller cluster sizes. Format a 2GB partition drive with FAT16 and your smallest cluster size is 16K; format it with FAT32 and you get 4K clusters on partitions up to 8GB. You should have no problem reading or copying files from FAT32 to a Zip disk. In fact, you can access both FAT16 and FAT32 hard drives on the same machine, provided you have Windows 95 OSR2 or later.

The Worthless Windows Key

I cannot begin to imagine how many gamers out there despise the little Windows key on keyboards these days. Have you ever been really far into a game, and accidentally hit that cursed piece of poop? Why not use a mouse to bring up the start menu, and if you don't have a mouse, press Ctrl-Esc? Honestly, who is that lazy? Is it possible to disable or reassign keys on a keyboard?

—Colin Hamdon

If thine keys offend thee, pluck them out. Unfortunately, this is probably the easiest way to cripple the Windows key, since Windows doesn't come stock with a utility that permanently disables it. If you don't feel up to mutilating your keyboard, you can try one of the several shareware keyboard remappers on the web or load up the remapping utility that comes with Microsoft's Kernal Toys. Although Microsoft discourages running its Kernal Toys in Windows 98, I haven't run into any problems with just the keyboard remapper installed.



Microsoft's Keyboard Remap tool adds a remap tab to the Keyboard control panel that allows you to redirect the actions of the annoying Windows key.

READERS SHARE THEIR HOME REMEDIES

second opinions

Schooling the Doctor

I beg to differ about the DirectX problem that Jon Taylor wrote about in your January 1999 issue. If you reread Taylor's letter, he wasn't asking to uninstall DirectX 6, he was asking to restore DirectX 5. His January letter states, "I want DirectX 5.0 back..." and, "There's no option for restoring DirectX 5.0."

The way to restore DirectX5 and is by reinstalling Windows 98, not from scratch but over the current installation. How do I know this? Because I had the very same problem with a piece of game software that Jon Taylor did. It simply would not install on either of my computers, one with a 3D card and the other without one.

Regarding Scorpio: If you read between the lines, his question had more to do with the grinding rather than virtual memory and the amount of RAM he had. It wasn't the virtual memory that was bugging him, but his hard drive noise. To me, addressing the noise would have eliminated the virtual-memory question. While it is true that something is always running in the background with Windows, sometimes it is hard to tell exactly what these things are. With some Norton apps, Windows Task Scheduler and *WordPerfect*'s Quick-Find, among others, you would be hard-pressed to figure out exactly how and why these "background" things started. When you're playing something like solitaire, which should be running only in RAM, these background apps sense that the hard drive isn't being accessed and begin to do their logging, finding, or whatever they do. Perhaps you could have addressed how Scorpio could have changed the settings of the background apps in order for them to come on at another time. The best mechanic is one who can diagnose symptoms as well as make repairs.

Jeff's letter in the February issue about *Disk Cleanup* may have something to do with his swap file, no? If he has a gig left, and Windows thinks it needs some of it, wouldn't it ask him to reserve some? Maybe the solution would be to add more RAM instead of disabling the *Disk Cleanup*. Alternatively, he might try defragging to clean up the disk. If it is really bad, and Windows has taken the only clean section for its swap, maybe there isn't much room left on it.

OK, so I'm neurotic, but I hate disabling something that is put there to assist me. People can say what they want about Windows, but it has never let me down and I've had Win95 from day one and Win98 from day one.

—Brian Mahoney

> **My 10.2GB Seagate hard drive is chock-full of bad sectors according to the legend that appears when I run Win98's defrag.**

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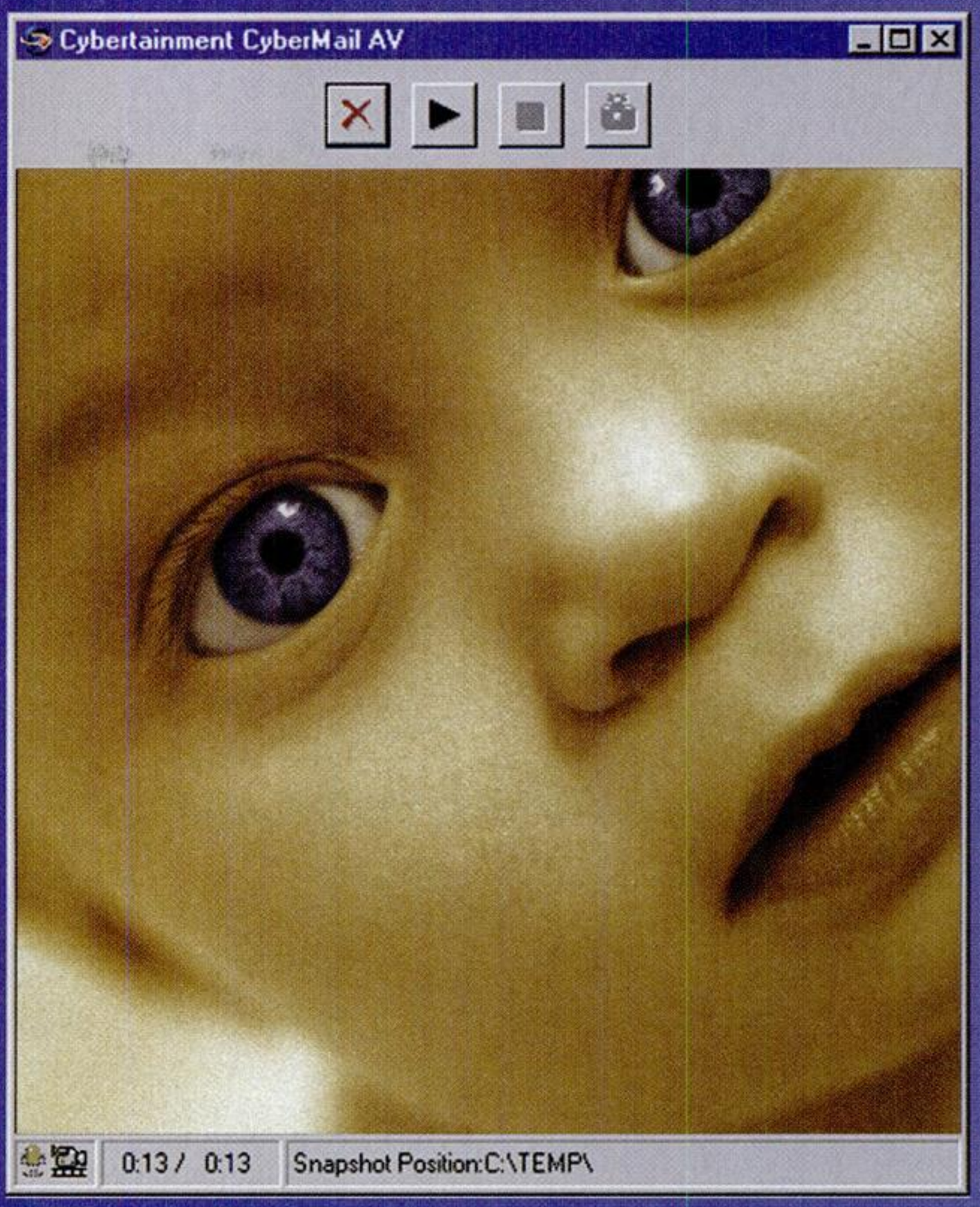

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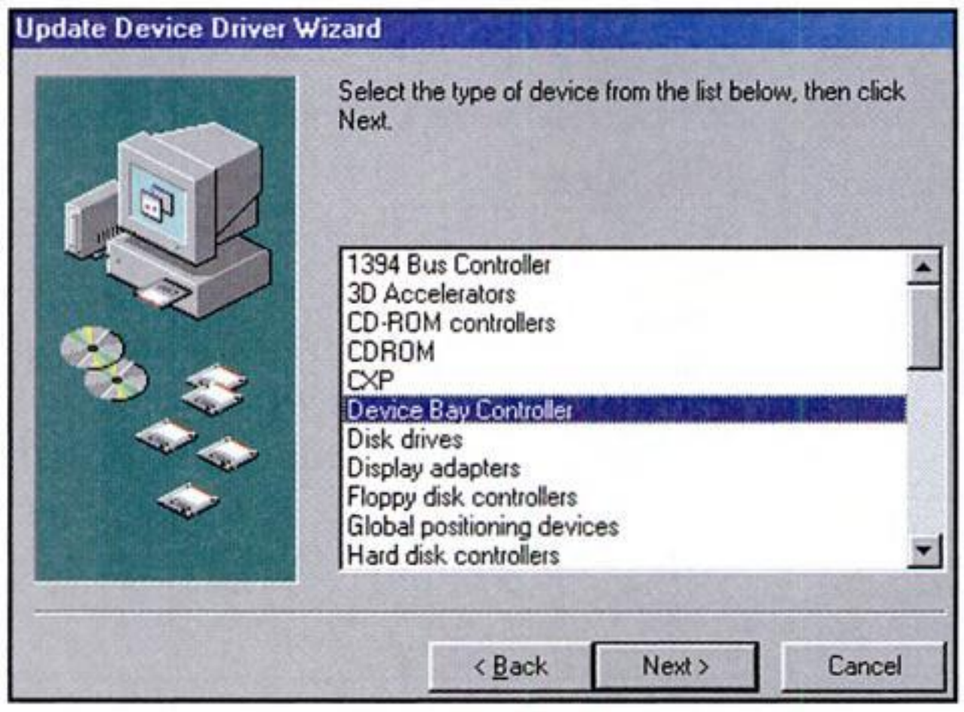
Windows 98 Second Edition

The Second Coming

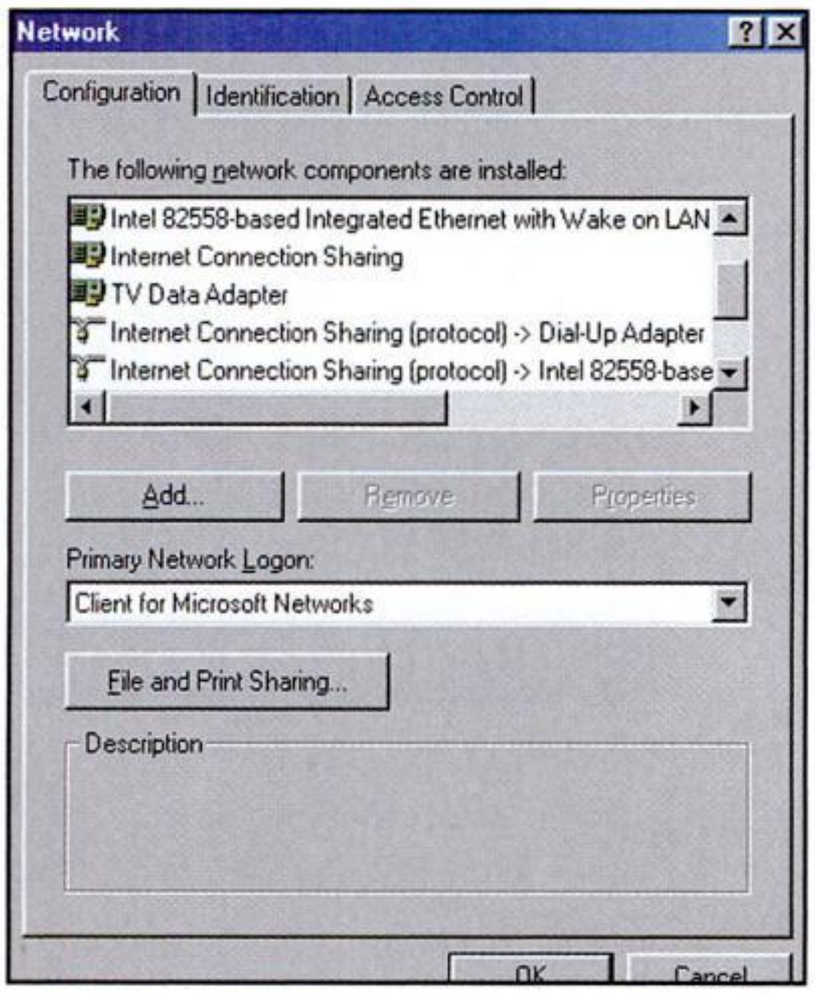


In Q4 1999, Microsoft will release a second version of its Windows 98 operating system, the Second Edition, which will integrate bug fixes and new features. The Second Edition will be available in an updated retail box (still priced at $90) or on new machines from most PC manufacturers. Current Windows 98 users can download the bug fixes in the form of a Service Pack for free or purchase an upgrade CD for $20 that includes the fixes plus a bevy of new features.

The Service Pack will contain fixes only for existing Win98 technologies. This includes fixes for known Year 2000 issues, active accessibility (to empower those with disabilities), and a slew of driver updates for devices supported when Win98 originally shipped. The *Internet Explorer 4.01* Service Pack 2 is also included, along with support for fonts for the euro, the new European currency.

Don't expect to see *Internet Explorer 5.0* or DirectX 6.1 included in the Service Pack; they can already be downloaded for free. Both will be included on the Feature CD along with new features such as Internet Connection Sharing (ICS) and Wake-On-LAN, allowing machines with network interface cards (NICs) supporting it to wake other machines in a low-power state.

USB support has been beefed up, so devices can be recognized individually, instead of per-port.



Internet Connection Sharing (ICS) has been added, allowing a machine to share a single Internet connection with other machines on a home computer network.

While testing Second Edition beta 2, we found that device driver support has been beefed up tremendously, making the $20 CD well worth the price.

Also added is USB modem support with code built around the ratified USB Communication Device Class, version 1.1 standard for modems. ADSL and Cable modem drivers are included, and Microsoft has addressed the shortcomings of Win98 when connected to an Asynchronous Transfer Mode (ATM) network. In the past, ATM access for broadband devices was provided through LAN emulation (LANE). Microsoft fixed this with the addition of IP/ATM, providing increased performance and less network overhead. Also added is PPP/ATM, which extends the ATM network to dial-up networking (DUN), further enabling an end-to-end solution for residential broadband networks such as ADSL and UADSL.

Device Bay, a new connection standard and formfactor that allows floppies, hard drives, CD/DVD-ROM drives, and the like to be hot-swapped finally gets support. Full support for the 1394 universal and open host controller interface is also included, allowing for the plugging-in of camcorders and hard drives.

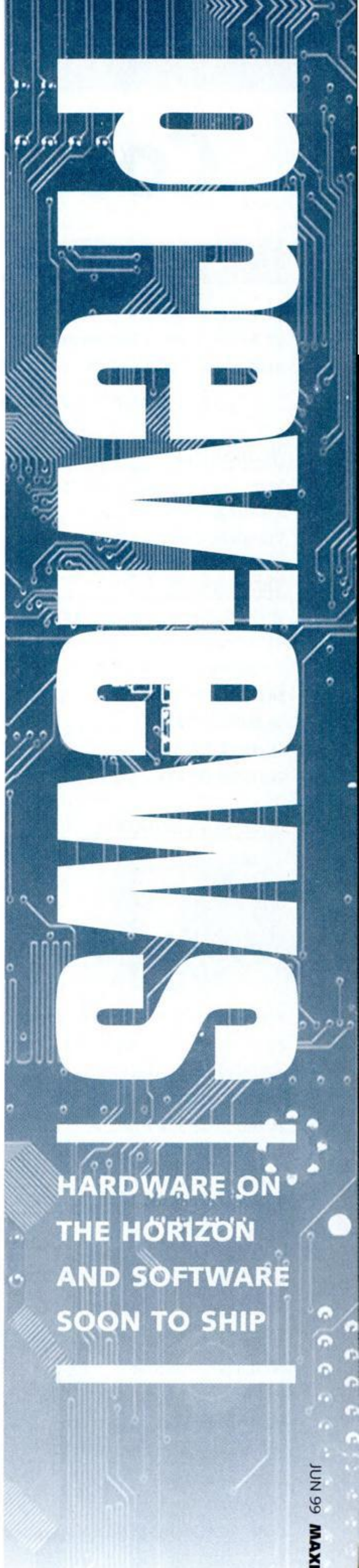
Updates were made to WebTV, making it compatible with more hardware and adding support for rating restrictions and interactive TV broadcasts along with advancements to Advanced Configuration and Power Interface, increasing its performance and adding more granular control to settings. This allows power management to be controlled on a device-class basis all the way down to mice and keyboards.

—Sean Cleveland

PRODUCT AVAILABLE

Price Service Pack: Free from web site; Feature CD: $20; Full Version: $90
Company Microsoft
URL www.microsoft.com

Q4.99



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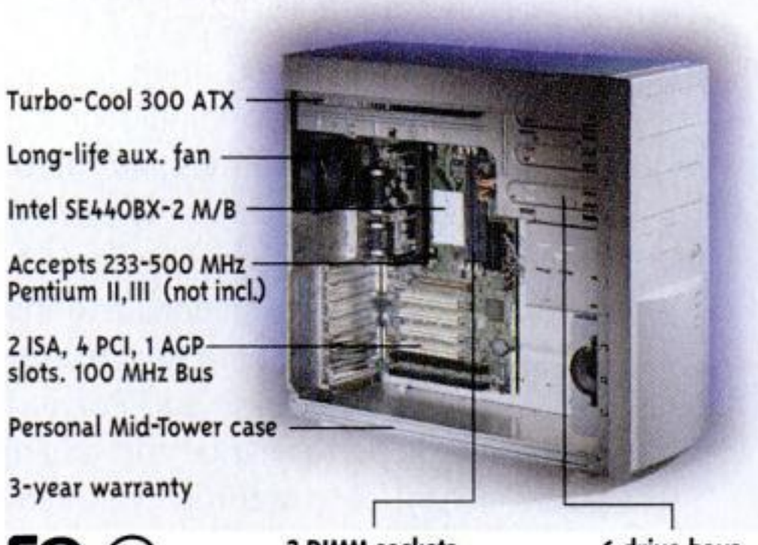
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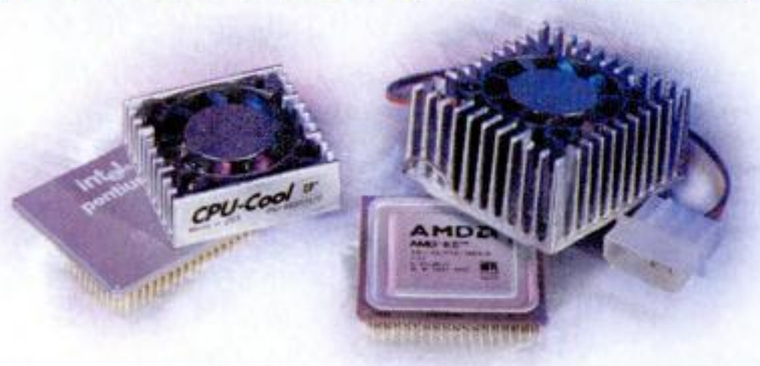

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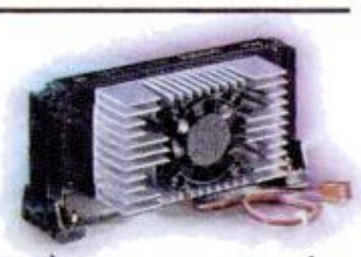

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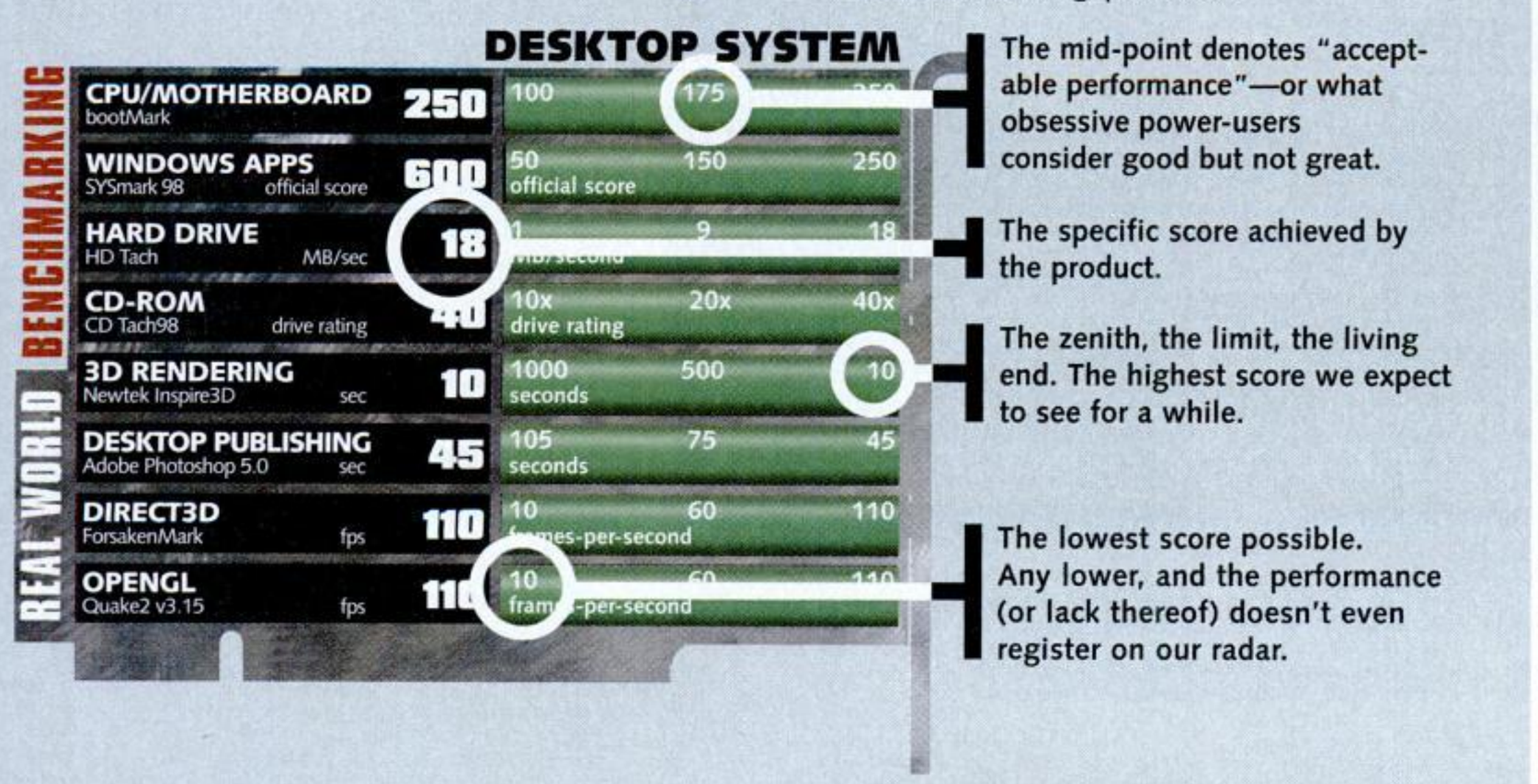

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Compaq 5600s

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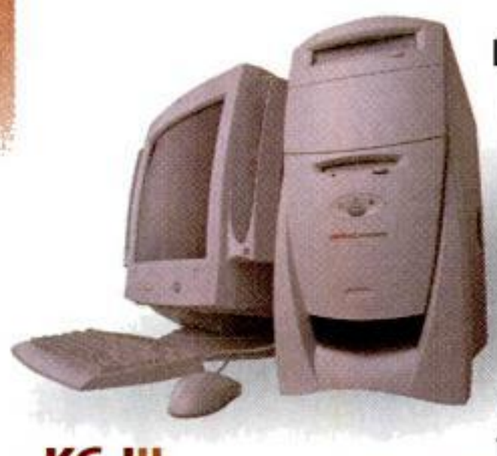

K6-III blurs the performance gap between Intel and AMD.

PLUSES
- Speedy K6-III
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MINUSES
- IBM 14.4 Deskstar luster fading
- Not enough open bays
- Funkay Torx screws
- Can you say ugh to Mediamatics DVD?

Let's face it. For power users, using AMD silicon has been about as anti-establishment as owning an electric car. But with Compaq's new K6-III-powered 5600s, that electric car finally looks appealing. Ticking along at 450MHz, the 5600s made few apologies as it smashed down our crop of performance benchmarks.

The 5600s last pulled into our labs at 450MHz for our April shootout with Intel's Pentium II and Pentium III. Then equipped with a mere 512K L3 cache, the third-level cache that makes the K6-III unique, the AMD lagged in floating-point benchmarks and our Windows applications test suite.

This 5600s came with a full 1MB of L3 cache; the difference was night and day. In SYSmark, the extra 512K gave an 11-point boost, just four points behind a comparable 450MHz Pentium III. Imagine what a full 2MB of L3 cache would do.

The extra cache didn't always help the 5600s in floating-point tests. Usually a second-place finisher to Intel silicon in FP, the 5600s turned in respectable but not spectacular scores in 3D rendering and *Photoshop*. For kicks, we popped in a Diamond Monster Voodoo^2 card (augmenting the Diamond Viper 550) to test the CPU's 3DNow! optimizations. As always, the special instructions to speed up 3D made a difference. In *Quake II*, the non-3DNow! drivers gave us 42fps. With 3DNow! enabled, the 5600s kicked it up to 57fps. But enough about the CPU.

Compaq does its usual job in equipping the 5600s. On the front and back of this curvaceous mauve box, Compaq includes USB and IEEE 1394 "FireWire" ports. If you have a digital video camera with a FireWire port, you're ready to go.

The DVD is Pioneer's tray version of the DVD103S, which garnered a 9/Kick Ass in our May 1999 issue. Turning in 4x DVD speeds and a 22x average CD-ROM speed, the Pioneer doesn't disappoint. An internal Zip and floppy backs up the DVD.

Inside, Diamond's MX-300 soundcard sings through dual-analog outputs hooked up to a quad set of JBL speakers. Compaq scores a bonus with the MX-25 daughtercard, which plugs into the MX-300 for full Dolby Digital 5.1 output. With a Dolby Digital decoder and a six-speaker set, the real need for DVD becomes apparent. Even if you don't have a decoder, the MX-300 let's you output 4.1 audio over the JBL speakers.

While Compaq supplies Mediamatics' softDVD with the 5600s, we can't recommend that you use this hideous decoder. Instead, download Zoran's 2.0 player from Diamond Multimedia. It may not be within Compaq's license, but Zoran's player is a marked improvement over Mediamatics', and you can use the S/PDIF 5.1 output of the MX-300. Compaq also scores with the Viper 550, which sports TV out, analog SVGA, and digital flat-panel support.

A Lucent-based V.90 modem, G.Lite DSL modem, and 10/100 Ethernet card round out the package. Although the controllerless modem may add overhead to Internet gaming, it might be worth the trade off if you're anticipating G.Lite service in your neighborhood. We couldn't figure out why the box came with an Ethernet card.

Our only complaint came from the acceptable, but not stellar score of the IBM Deskstar hard drive. A star in its day, its performance has been eclipsed by its 22GB big brother. We could also ask for more drive bays, but for several hundred dollars less than its Pentium III sibling, the 5600s gives you a whole lot of loving.

—Gordon Ung

UNDER THE HOOD

THE BRAINS

CPU	AMD K6-III
L2 Cache	256K full speed
L3 Cache	1024K pipeline-burst SRAM
RAM	128MB 100MHz SDRAM
Motherboard	Compaq Jaguar based on VIA chipset
Drive Bays	Three 5.25-inch. one 3.5-inch
I/O Ports	Four USB, two IEEE 1394, one joystick, one serial, one parallel port

DISPLAY

Videocard	Diamond Viper 550 16MB with TV/digital flat-panel out
Monitor	Compaq MV900 19-inch
Res/Refresh	1600x1200/75Hz

STORAGE

I/O	E-IDE
Hard Drive	IBM Deskstar 14.4GB 7,200 RPM
CD/DVD	Pioneer DVD-113 6x drive
Removable	1.44MB floppy, Iomega Zip 100MB
Fax/Modem	Lucent V.90/56K modem and G.Lite DSL

SOUND

Sound	Diamond Multimedia MX-300 with S/PDIF for Digital Dolby 5.1 output
Speakers	JBL 4-point

BUNDLE

Windows 98 | Quicken 99 Basic | Microsoft Money | Encarta | Asymetrix DV Producer | Network Associates ViruScan | Compaq Restore Utility

BOOT 0:53 DOWN 0:02

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD bootMark		236
WINDOWS APPS SYSmark 98	official score	180
HARD DRIVE HD Tach	MB/sec	11.8
CD-ROM CD Tach98	drive rating	22x
3D RENDERING Newtek Inspire3D	sec	635
DESKTOP PUBLISHING Adobe Photoshop 5.0	sec	74
DIRECT3D ForsakenMark	fps	108*
OPENGL Quake2 v3.15	fps	56

NOTE: *Sound disabled

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EXPANSION NOTES

While we always ask for more drive bays, this baby has it in PCI and memory slots. With two DIMM slots open, the 5600s can take you to 384MB of system RAM. Although there's really only one open PCI slot because of the MX-25 daughtercard, you won't need much more with DSL, FireWire, and a 10/100 NIC built in.

EXPANSION MAP

AGP Videocard
PCI Modem/DSL
PCI MX-300
PCI Free
PCI Network
PCI/ISA MX-25 daughter card

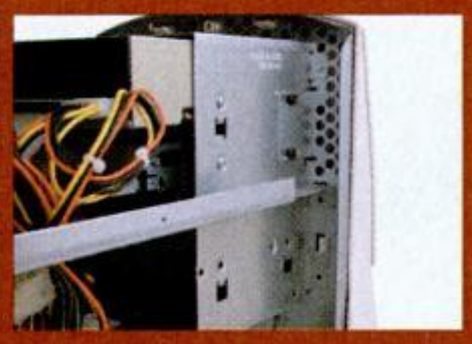
IROS

00 System Timer	**08** System clock
01 Keyboard	**09** ACPI power mgmt
02 Interrupt controller	**10** Soundcard/FireWire
03 Free	**11** USB/Modem
04 Com 1	**12** PS/2 Mouse
05 MX-300 DOS driver	**13** Num data proc
06 Floppy	**14** PCI Bus Master IDE
07 LPT1 Printer	**15** Secondary IDE

DMAS

00 Printer	**03** MX-300
01 MX-300	**04** DMA
02 Floppy Disk	

It's a smorgasbord of connectors 10/100 NIC, USB, IEEE 1394, Dolby Digital 5.1 output, and dual analog sound output jacks. More holes than you can fill!



Scotty, get me that drive bay! While you have almost everything you'd want, Compaq skimped on drive bays that can be accessed externally. Slap in your CD-R and you're out of space.

What's behind door number one, Monty? Pioneer's smoking DVD drive and a 100MB Zip are tucked behind door number one. Just make sure you don't eject a Zip disk with the door shut.

And there's door number two, too Compaq knows how to throw in the bonuses, like IEEE 1394 behind a smoked plastic window and two USB ports.

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Turok 2: Seeds of Evil

N64 seams are showing

The 32-bit template and polygonal graphics help the dinosoids in Turok 2: Seeds of Evil look great even up close.

"...And another thing, put dinosaurs in it. Big 3D dinosaurs. Dinosaurs are hot right now."

And so the producers at Acclaim dreamed up *Turok 2: Seeds of Evil*, Acclaim's sequel to the monstrously successful N64 game (and year-later PC shooter). Unfortunately, in this age of *Half-Life*, *Unreal*, and *Thief*, the once-cutting-edge graphics appear dated. But you can expect better framerates than *Trespasser*, last year's hardware hog.

THE SPECS

3D CARD SUPPORT
- OpenGL
- Direct3D

MULTIPLAYER
- LAN
- TCP/IP

PLUSES
- Great looking enemies
- Strong enemy AI
- Supports both Direct3D and OpenGL
- Excellent variations of weapons
- Enjoyable multiplayer

MINUSES
- Unnecessary and annoying fogging effect
- Environmental graphics B-list quality
- Small volume of enemies
- Character POV too low to the ground

Once again, you play Turok, Dinosaur Hunter Extraordinaire, who must plow through six immense levels filled with death-dealing dinosoids and fulfill various level objectives—such as turn on beacons and rescue children—to save this Lost Land. These mini-quests aren't much different from the "find the switch" gameplay of 3D-shooters past and bring nothing new in this era of story-driven first-person action games.

Turok 2 is far bigger and badder than its predecessor. The gaming environment covers 30 virtual square miles, 35 enemies, and some 24 truly unique weapons (such as the Cranial Bore, which hunts out your target and burrows quickly into its skull). Through the use of Softskin technology, characters are composed of a smooth polygon mesh as opposed to intersecting body pieces for smoother-looking models with bulging muscles and wrinkling skin. These prehistoric polygon terrors look great against their 16-bit palette. A collision-detection system lets you target specific areas of the enemy's body, such as the head (for maximum damage), with realtime body-impact physics making the dinosaurs flinch realistically and blood spurt from wounds.

Turok also implements realtime lighting effects that use up to 10 dynamic lights for realistic surface effects such as flickering firelight and shimmering water. But these exciting effects come at a price. While the game supports both Direct3D and OpenGL, you'll get motion sick playing with anything below a Voodoo^2, G200, or TNT. At 800x600 with a Voodoo^2 SLI setup, our 400MHz Pentium II managed to eke out 46.9fps—as long as we stayed out of the water. There was also a ridiculous amount of clipping, with downed dinos constantly falling halfway through walls.

Shortly into the game, its console origins begin to show. The N64 graphic cheat of fogging keeps you from seeing more than 30 yards ahead, which is not only irritating, but counterproductive. At one point, you have to take out a grenade-throwing enemy. But if you back up, he disappears behind the fog; get too close, and he pulverizes you.

Deathmatches sport a huge variety of weapons to choose from and some great maps to play on. With 16 gamers per map, the action was still fluid, though the fog manages to kill a lot of the excitement.

In the end, *Turok 2* is a solid first-person shooter, but unless you like dinosaurs, we recommend picking it up only after you've played through last year's A-list of first-person shooters.

—Shane Mooney

MAXIMUM PC VERDICT

Price $45
Company Acclaim
Phone 516.656.5000
URL www.turok.com

6

CARNIVORES

From the people who brought you *Deer Hunter*, *Bird Hunter*, and *Rocky Mountain Trophy Hunter* comes Dinosaur Hunter, er, we mean *Carnivores*, though the former label would serve just as well in describing this surprisingly enjoyable, bargain-priced title. Like those other hunter titles, you grab a gun (four altogether), pick from seven species of dinosaur and six environments, and set off to get some dinosaur trophies.

Priced at $20, this isn't exactly the *Unreal* engine we're talking about, but unlike *Turok 2*, a 3D card is recommended, not required. Still, the graphics manage to look exceptionally good for a value product, using a true 3D engine, 16-bit color, and other 3D goodies such as shadow casting.

Unlike Deer Hunter, these animals fight back and won't give you too many second chances.

Free from the hyperbole and pretentiousness *Turok* suffers, *Carnivores* is about nothing more than hunting dinos in their natural habitat. You need to keep quiet, stay downwind, and bag as many as you can so you can move on to bigger and badder thunder lizards. Though it doesn't offer the variety of weapons, enemies, or depth as *Turok 2*, it's a fun, albeit too short, ride.

MAXIMUM PC VERDICT

Price $20
Developer Action Forms
Publisher Wizard Works
Phone 800.229.2714
URL www.wizworks.com

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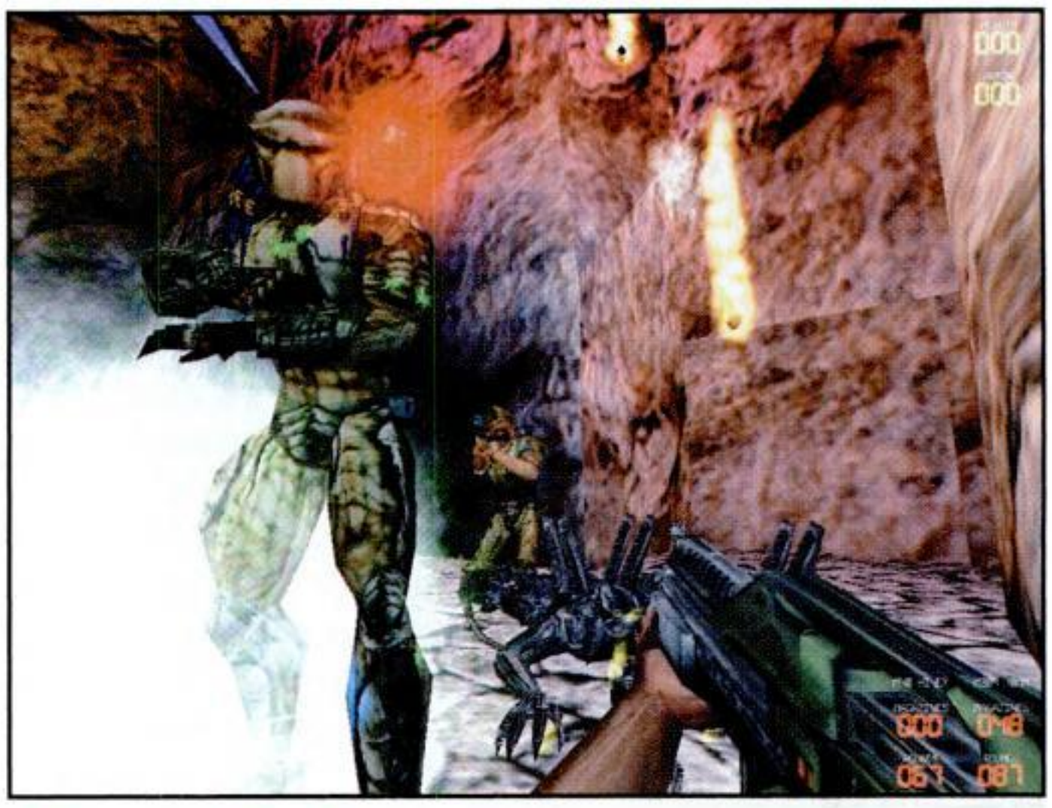
Aliens vs. Predator

Choose your own adventure



Aliens vs. Predator pits species against species against species.

Rekindling one of the coolest crossovers of the decade, Fox Interactive's *Aliens vs. Predator* has all the trappings of a great first-person shooter, combining the tension of the films, the action of the comic, and three characters to play. Though promising action, *Aliens vs. Predator* suffers from a variety of minor technical glitches and some bland level design. Despite these quibbles, it's still one hell of a romp.

AvP crunches out a rock-solid 30fps+ in Direct3D, with fluidly animated models composed of up to 1,000 polygons per character. Marines run and cringe in fear, Predators lumber menacingly, and Aliens speed toward you, bouncing off walls. The computer AI isn't shabby either, with Alien Queens darting behind crates as you lob grenades at them, or Marines ducking under your wrist-blade attacks.

You can play any of the three species, each with strengths and weaknesses requiring specific tactics. Though the Predator has an edge in firepower and armor, it's hindered by slow movement and finite energy. The Alien excels at sneaking up on opponents and climbing walls and ceilings, but its range is limited to hand-to-hand fighting. The Marine is quicker than the Predator, but has long-range firepower. *AvP* balances all three into even matchups.

The game's levels are expansive and complex, though not always intuitive. In the Alien levels, passages lead up walls and on ceilings, and if you thought *Jedi Knight* gave you vertigo, the Alien levels include some of the most stomach-churning designs ever. Unfortunately, there's no save-game feature, causing you to go back to the beginning every time you die. One glaring problem in *AvP* is the repetitive and bland textures used over and over throughout the levels. This, coupled with some bad polygon seams and poorly mip-mapped smoke effects, makes the environment hokey.

Playing the Alien is a surreal experience brought to you in warp-o-vision.

Grovel before me, puny human!

Along with the tepid textures, the sound effects are lifted straight from the films, and while not bad, they're far from exemplary. Complemented by the overly dramatic voice actors, the sound in *AvP* leaves something to be desired. However, anyone sporting Creative's latest Sound Blaster Live! will be in for an EAX-enhanced treat. No such support for A3D, though.

Multiplayer fans will have a blast pitting all three species against each other. Supporting up to eight players via TCP/IP and LAN, *AvP* sets the stage for some brutal fighting. Varying scenarios with bot matches would have been a welcome addition, allowing players to play out scenes from the films, but you only get the standard deathmatch arena, capture the flag, and tag.

Though varied textures and a save-game feature would have been a boon, the action in Aliens vs. Predator is fierce and frenzied.

—Dan Simpson

THE SPECS

3D CARD SUPPORT
Direct3D

3D SOUND SUPPORT
EAX

MULTIPLAYER
TCP/IP
Internet

PLUSES
- Tense gameplay
- Great character balance

MINUSES
- Thin and repetitive textures
- No save game feature
- Weak sound

MAXIMUM PC VERDICT

Price $45
Company Fox Interactive
Phone 310.369.1000
URL www.foxinteractive.com

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GETTING THE MOST OUT OF EACH SPECIES

PREDATOR: THE HUNTER HUNTED

With a bevy of impaling and projectile weapons, the Predator is one of the nastiest fiends around. But its greatest foe is its finite energy levels. Sure, it's great fun to cloak and snipe from afar. But the energy required is taxing, and will only let you rip off a few quick shots. It's best to ambush near a power-up site or leave yourself an escape path. Don't forget to use your grappling hook to split town if the firefight gets too hard to handle.

The Predator's vision makes targeting enemies much easier.

ALIEN: PART OF THE HIVE

Playing the Alien allows for a variety of unconventional tactics. The wall-crawling ability lets you grapple and climb any surface, including walls and ceilings. This is particularly handy when ambushing your opponent from above or the side. The Alien's natural camouflage allows you to hide in darkness virtually undetected, and with the Alien's extra-sensing capabilities, pouncing enemies from the darkness is so much easier...

Watch your back or you might be the next human breeding ground for these fiends.

MARINE: CAUGHT IN THE MIDDLE

The Marine's greatest strengths are his balance of speed and firepower variety. With the motion detector and visibility enhancements, the Marine can snuff out those skulking Aliens and cloaked Predators. Acclimate yourself to the motion detector, but watch out for things such as moving doors. Firing at inanimate objects will alert enemies to your whereabouts.

Thanks to the mtion tracker, you can sneak up on aliens and blast 'em where they hide.

For definitions of Terminator words, hyperlink to the back of Maximum PC, or check out the Terminator online at www.maximumpcmag.com.

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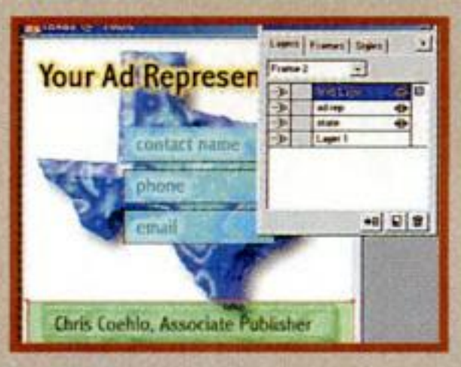
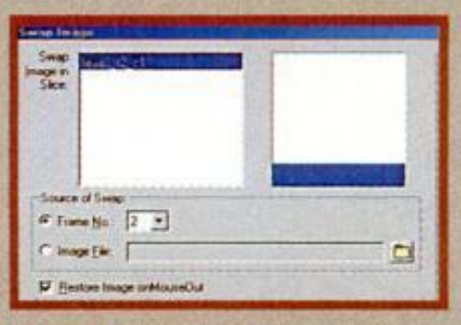
HOW TO SWAP IMAGES

Simple rollovers are easy. Having a different part of that graphic change requires a bit more JavaScript magic. *Fireworks 2* makes this chore easier.

Step 1: Create a multiple-frame graphic. In this example, the headline, Texas, and menu are shared over four frames by selecting Share Layer in the Layers palette. Only the text at the bottom will change; this text is placed on its own nonshared frame (Layer 1).



Step 2: On the Web Layer, use the Slice tool over the area that will be swapped out. Use the Rectangle Hotspot tool over each menu item to create three imagemap areas.



Step 3: Select the topmost hotspot image. From the Behaviors palette, click on the plus to add the behavior Swap Image to this hotspot. The dialog box that appears will ask you to select a slice from the left preview window. There is only one in this example, so click on the rectangle at the bottom of the box. Under Source of Swap, select which frame you'd like this information to be replaced with. Clicking on the menu item "contact name" should swap with the text on Frame 2; this number is entered here. Repeat Step 3 for the remaining two menu items.

Step 4: Export the file, making sure to select Use Slice Objects and an HTML style from the Save dialog box. Check the results from your web browser.

Fireworks 2

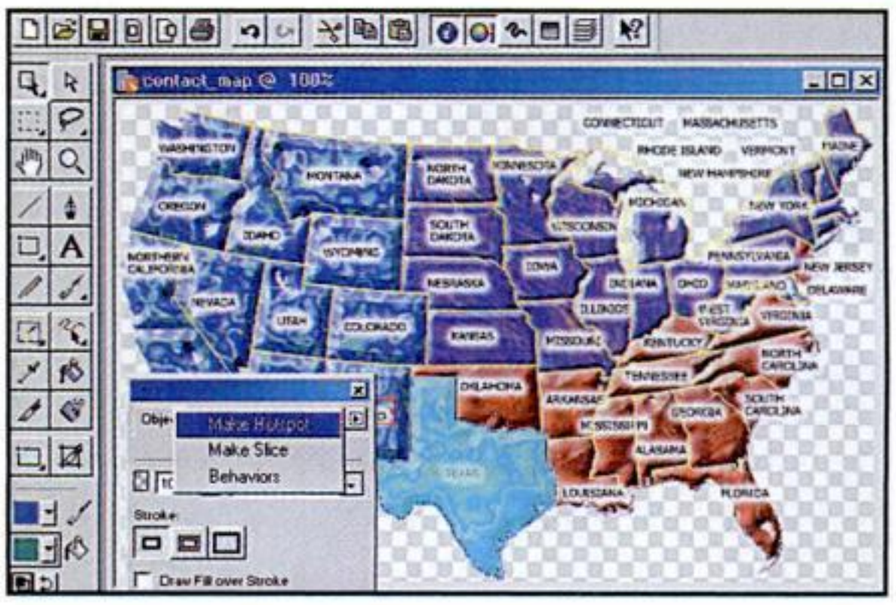
This optimizer's an appetizer

CHECK IT OUT Online
www.maximumpcmag.com
Check out an interactive finished project in the Re:Print section.

When we first met *Fireworks*, it was love at first site. Here was a sweet tool for web graphics and code that any person familiar with print-design software—*Photoshop*, *Illustrator*—and minimal HTML knowledge could savor. It was craftier than both—working vector and bitmap graphics simultaneously. Besides great-looking, well-compressed graphics, it served up peppery HTML code with JavaScript, imagemaps, and complex tables for garnish. Then we wanted more.

Our mouths watered at *Fireworks 2*'s improved fill and stroke controls that cream typical vector-based illustration programs. You can now place a stroke inside or outside the fill area, or split the width between the two. Multiple effects, such as bevels and drop shadows, can dress the same object. These improvements result in using only one path for what previously took several.

Fireworks 2's web-related items, such as imagemap areas and slices for tables, are now members of the Layers palette, instead of a separate toolbar that toggles on and off. Objects on these layers can be shared between frames, so a change to one frame doesn't have to be manually repeated on the others. But the spice is in the slice—web objects are created by copying a shape from a drawing layer to the web layer—extremely helpful when you want to make Texas into a lone imagemap area.



In Fireworks 2, creating an imagemap is as easy as copying a shape to the Web Layer.

The beef? The only way to edit imagemap paths is to tweeze each point manually. Advanced reshape tools and the new Simplify feature work great when you're working with vector-based drawing objects, but they don't work at all with vector-based imagemaps. At least you get more control over what these objects do. Previously, you could merely hitch an object to an URL or select a slice to rollover. *Fireworks 2* includes Behaviors and Object palettes that allow the inclusion of alt tags, targets, status messages, and swap images.

We wasted calories chewing the new Styles palette, which saves fill, stroke, and effects settings for graphics, plus font and size settings for text. These settings can be reused on other documents, but don't confuse these with actual style sheets. Any changes made to these "styles" won't update the graphics or text in your documents. Styles also can't be used with the new find/replace function or in batch processing.

Speaking of which, the "improved" batch processing promised us something called Scripts, which we'd hoped was a macro creator, so changes recorded in one document could be played back on others. In reality, Scripts in *Fireworks 2* is a fancy name for "Saved Batch Process Settings." While we're on the subject of letdowns, batch processes that cook up slices and HTML can only occur through the new Project Log palette; this function is missing from the actual Batch Process dialog box. And when HTML files are generated in this way, the program asks you to save each file, one at a time. What good is a batch process you can't walk away from?

The new Styles palette saves graphic and text effects that can be applied to other files, but don't confuse these with real style sheets.

The absolute coolest new feature is Export to Size, which lets you enter a target file size and have *Fireworks* find the best compression method to hit that number.

We can't deny that *Fireworks 2* is appealing. Creamy drawing tools, sweet HTML, well-brewed Java, low-calorie compression. But when a web graphics program sets out new plates, we expect a bit more food on them.

—Sherry Monarko

THE SPECS

GRAPHIC EXPORTS
JPEG, GIF, Animated GIF, PIC, BMP, TIFF, PNG

HTML EXPORTS
Generic HTML, Dreamweaver, FrontPage

PLUSES
- Exports graphics to targeted size
- Smarter tools and palettes
- Professional and easy to use

MINUSES
- Styles are not true style sheets
- Scripts are not true scripts
- Batch process needs babysitting
- Vector-based web objects can't be edited with advanced tools

MAXIMUM PC VERDICT

Price $199
Company Macromedia
Phone 800.457.1774
URL www.macromedia.com

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5% Of All PCs Are Ready for the Year 2000.

For the Rest, There's IntelliFIX 2000™

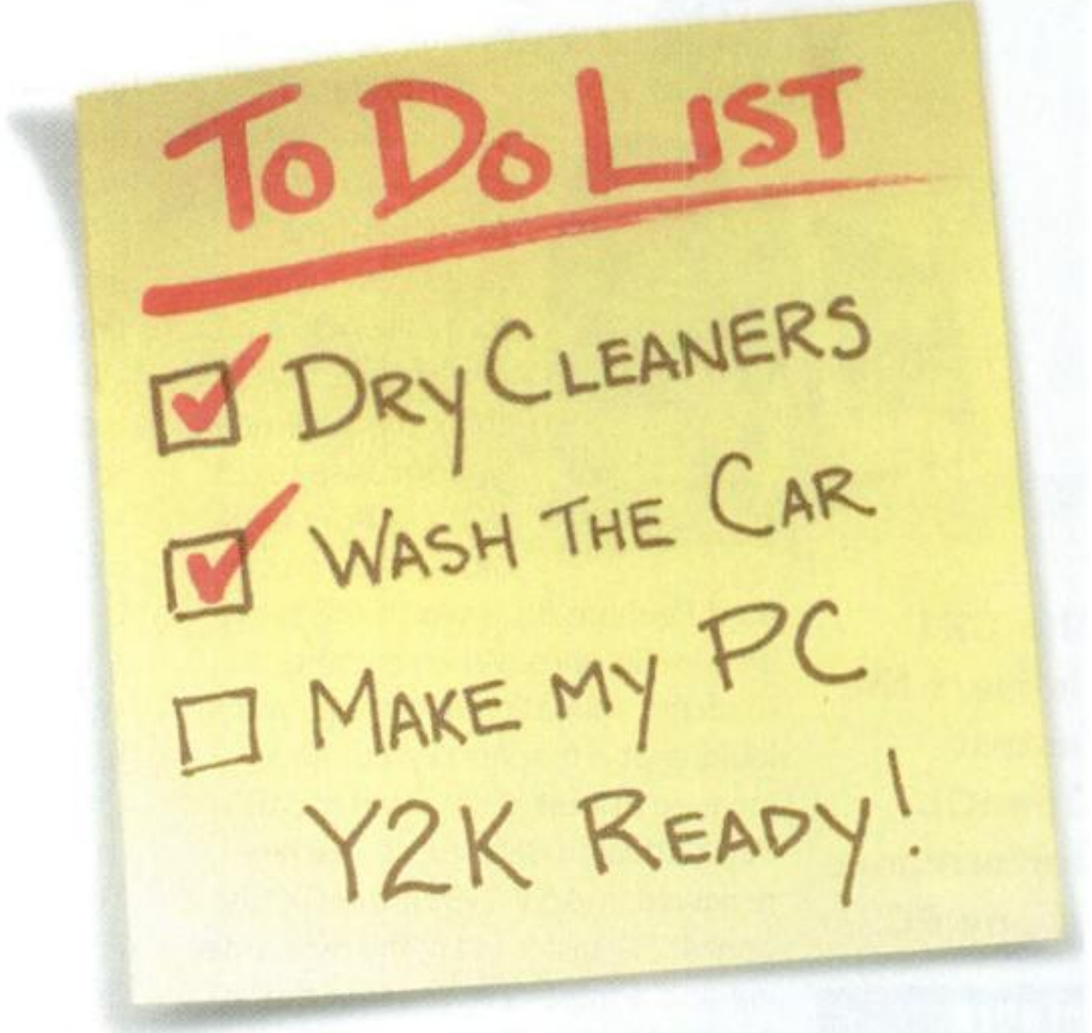
If you're reading this, you probably have a Y2K problem. That means on New Year's Day, 2000 your $3,000 computer simply won't work well — if it works at all. Imagine going to work on Monday Jan. 3, 2000 and finding out you're unable to do the things you've come to rely on, like check your e-mail, write a memo or browse the Web.

Well, don't dust off that typewriter just yet. There is a foolproof solution to your Y2K problems. It's IntelliFIX 2000.

IntelliFIX 2000 fixes your computer's Y2K software conflicts by looking at every line of application and operating system code, selecting each line that has a Y2K conflict, and making the code Y2K compliant. But that's not all. IntelliFIX 2000 also fixes all Y2K hardware conflicts in the BIOS and CMOS Real-Time Clock. . . guaranteed!

It's truly simple to use. Just pop in the IntelliFIX 2000 disk and watch it automatically find and fix your PC's millennium bugs.

Time is running out. Protect your PC and the valuable data stored in it with IntelliFIX 2000.



Passes Key Labs rigorous testing.
Download your free test version of IntelliFIX 2000 to test your PC for Y2K compliance at: www.intelliquis.com/intellifix.html

Add IntelliFIX 2000 to your New Years Eve party shopping list.

And, Have a Happy New Year!

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Intergraph GX1

When only the best will do

Intergraph's GX1 is the fastest NT workstation we've ever driven, but it's also one of the most expensive. So, ask yourself, "What's more important, price or performance?"

The GX1 delivers the fastest OpenGL performance of any PC.

While the GX1 is indeed a screaming Mimi, with the fastest OpenGL performance you'll find in a PC, we don't think the incremental performance boost you get from two Xeons vs. two standard Pentium IIIs is worth the beefy increase in price. When it comes to hardcore animation rendering, you're looking at a modest performance increase at best. Compared to SGI's 320 (a dual 500MHz P-III machine reviewed in April 1999), the GX1 is only 4.7% faster in *Lightwave* rendering and a mere .9% faster in the *3D Studio Max* render. If your shop makes a living cranking out animation/effects around the clock, the additional $2,500 the two Xeons will set you back will eventually be recouped. In a small development house, where the number of seats are more important than saving a few seconds on a handful of benchmarks, you can save by buying two standard P-IIIs rather than Xeons.

Where the GX1 really shines is in OpenGL performance, which draws power from Intergraph's Wildcat graphics technology. The two-card solution takes up the AGP 2x and PCI slots. The cards, connected via a proprietary ribbon connector, control both your 2D and 3D graphics. When we compared the Wildcat's OGL performance to SGI's Cobalt graphics, we found the Wildcat delivered 12.5% more frames to the screen on the DRV-05 Viewperf test and 137% more on the Awadvs-02 test. Unlike the Cobalt solution, which uses system memory for textures, Wildcat pulls from the 64MB of texture memory on the boards. The Wildcat also employs a 16MB SDRAM frame buffer, which helps the card pump out up to 3.4 million shaded triangles per second in true color.

The GX1's Cheetah drive, attached to a Symbios Logic single-channel Ultra 2 card, handles an average of 16MB/sec across the platters. In another test, we used the GX1 as a server to crunch web stats using SQL 7. The machine handled everything we threw at it for two weeks without crashing once.

But while everything is fine and dandy on the proc, hard drive, and 3D graphics fronts, the GX1 stumbled in our CD-ROM and *Photoshop* tests. At 20.4x, the CD-ROM drive was roughly 6% slower than SGI's. The system was also about 6.9% slower in *Photoshop*, due to the 320's better 2D performance. Where the 320 could kick out 1900x1200 at true color, the GX1 maxed out at a wimpy 1280x1024.

Another thing SGI has over Intergraph is a cool design. The GX1's blue tower is OK (isn't that design about three years old now?), but how difficult is it to make a matching monitor, mouse, speakers, and keyboard? The other thing missing is any form of large removable media. For $10,000 we expect something to back our work up to.

Aside from those minor annoyances, the GX1 is still one of the most rock-solid performers you're going to find.

—Rick Popko

UNDER THE HOOD

THE BRAINS

CPU	Two Intel Pentium III 500MHz Xeons
L2 Cache	512K
RAM	256MB 100MHz SDRAM upgradable to 2GB
Motherboard	Intel MS440GX
Drive Bays	Six 5.25-inch bays, four free
I/O Ports	Mouse, keyboard, two USB, Ethernet, printer, two serial, joystick, and audio in/out/mic

DISPLAY

Videocard	Wildcat
Monitor	Intergraph 21-inch

STORAGE

Hard Drive	Seagate Cheetah 9GB 10,000RPM SCSI
CD/DVD	Sony (CDU701)
Removable	Floppy
Fax/Modem	10/100BaseT Ethernet on motherboard

SOUND

Sound	Crystal (CS4235) chip on motherboard
Speakers	Built into Intergraph keyboard

OTHERS

Three-button mouse

THE BUNDLE

Windows NT, Intersite management software, RenderGL

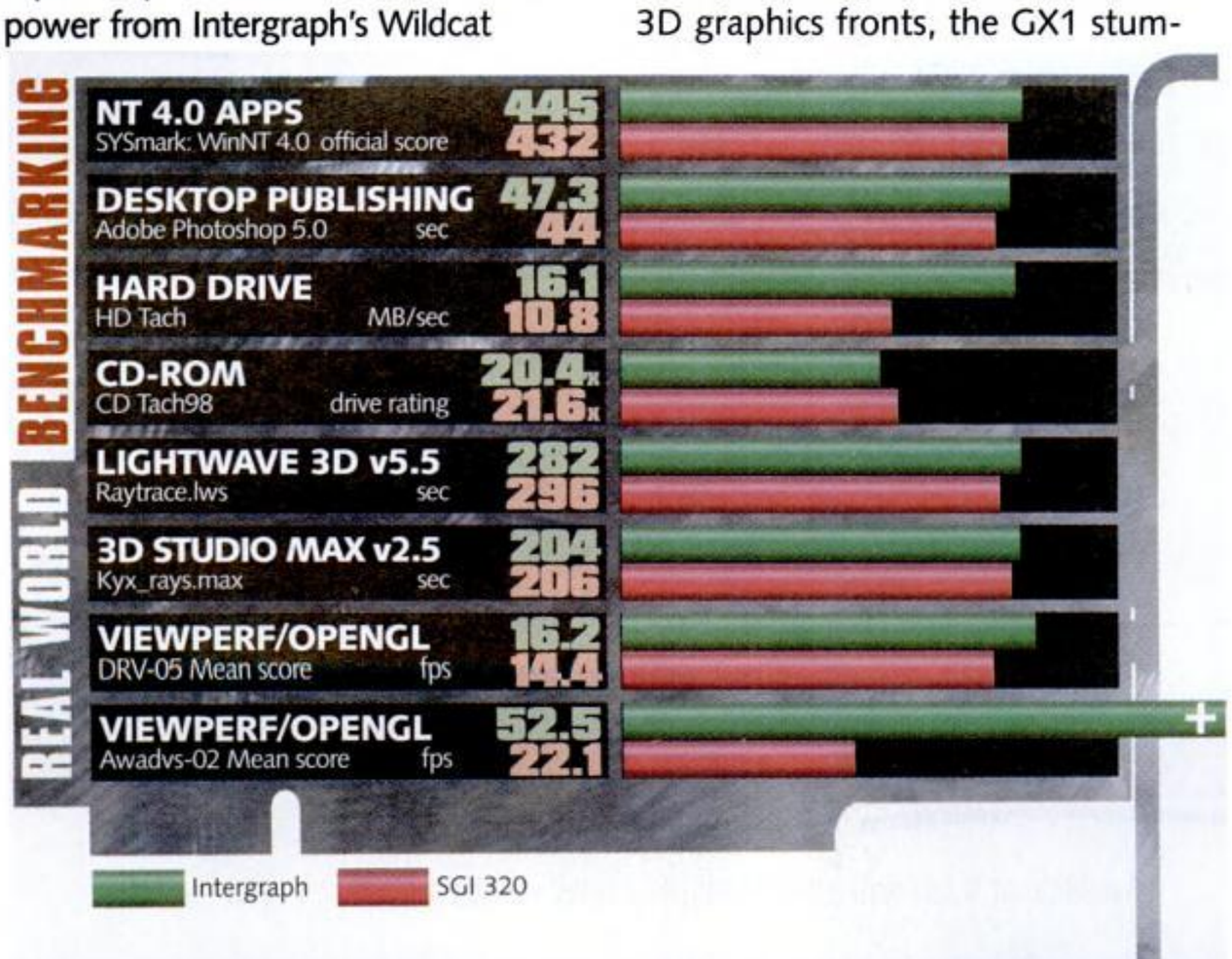
BOOT 1:11 DOWN 0:05

PLUSES

- Extremely fast 3D
- Lots of room for expansion
- Very stable

MINUSES

- Keyboard/mouse/monitor don't match case
- Crap speakers in the keyboard
- No large-size removable media



MAXIMUM PC VERDICT

Price $9,950; $11,049 with 21-inch monitor
Company Intergraph
Phone 800.543.1054
URL www.intergraph.com

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EXPANSION NOTES

The GX1 has lots of room to grow, with four free 5.25-inch drive bays, three empty PCI slots, and a free PCI/ISA. The good news is that all of the slots can accommodate full-length cards.

EXPANSION MAP

AGP	Wildcat graphics
PCI	Wildcat graphics
PCI	Free
PCI	Symbios Logic Ultra 2 SCSI
PCI	Free
PCI	Free
PCI/ISA	Free

IROS

01 Keyboard/mouse	**11** Audio
03 Serial	**12** Keyboard/mouse
04 Serial	**14** ATAPI
05 Audio	**52** Graphics
06 Floppy	**60** SCSI
08 Networking	**128** Graphics

DMAS

00 Audio	**02** Floppy
01 Audio	

Dated audio Intergraph has been selling the same old, tired multimedia keyboard for the past five years. The wimpy sound these guys put out doesn't do justice to the rest of the system.

This Wildcat roars The Wildcat graphics cards put this system over the top. The two cards (one AGP and one PCI) are attached via a proprietary connector that moves data more efficiently than through the bus alone.

Brand-name drive The Seagate Cheetah Ultra 2 is fast, but not as fast as IBM's Ultrastar 9LZX (both reviewed in March 1999). Symbios Logic's SCSI card hooks up two more Cheetahs and stripes them together, making a perfect server.

Hide-n-seek The flip-up faceplate pulls down easily to conceal the machine's drive bays. While this makes the box look more attractive when clients are looming overhead, it doesn't offer any type of security.

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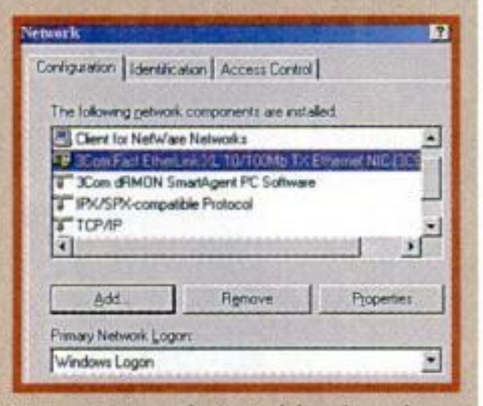
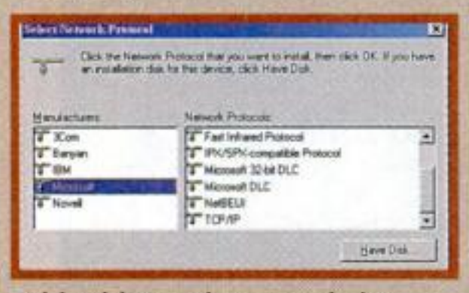
CONFIGURING PEER-TO-PEER NETWORKS

Windows automatically installs the basic network files along with your network adapter's or Network Interface Card's drivers. You configure protocols, drive and printer sharing, and network settings.



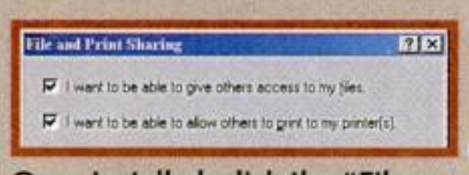
Your Network Neighborhood properties screen should look like this. Under the Identification tab, the Computer Name needs to be different on each machine while the Workgroup needs to be the same.

Both the IPX/SPX and TCP/IP protocols are generally added. If not, you'll need to add them manually.



Add additional protocols by clicking the Add button. All the protocols can be found under the Microsoft selection.

Only the TCP/IP protocol requires manual configuration. Your ISP should provide the necessary settings. To add or change these, select TCP/IP and click the Properties button. For non-Internet machines, use 192.168.1.1 for the IP address and 255.255.255.0 for the Subnet Mask. Just increment the last digit of the IP for each machine, but keep the Subnet Mask the same.


File and Print Sharing
I want to be able to give others access to my files.
I want to be able to allow others to print to my printer(s).

Once installed, click the "File and Printer Sharing" button, then manually specify whether others have access to your files or printer(s) or both.

Do this to the rest of your machines. To share directories, use Explorer or My Computer, right-click, and select sharing. You'll need to specify a share name. Then, use the Network Neighborhood to access shares from other machines. To share a printer, add it via the printers icon in the Control Panel and use the Network printer option to find the shared printer.

2.4GHz Wireless Networking

No strings attached

Wireless networking began to gain legitimacy with the IEEE's creation of the 802.11 standard in 1997. But only this year have price and technology come together for consumers. Don't let the romantic idea of a wireless universe fool you—there's a lot of room for improvement, and the "standard" needs to settle down.

Because there's no conformance test suite or governing body for the spec, compliance is scant. The University of New Hampshire's independent test facility has stepped up, but has not yet published its compliance tests.

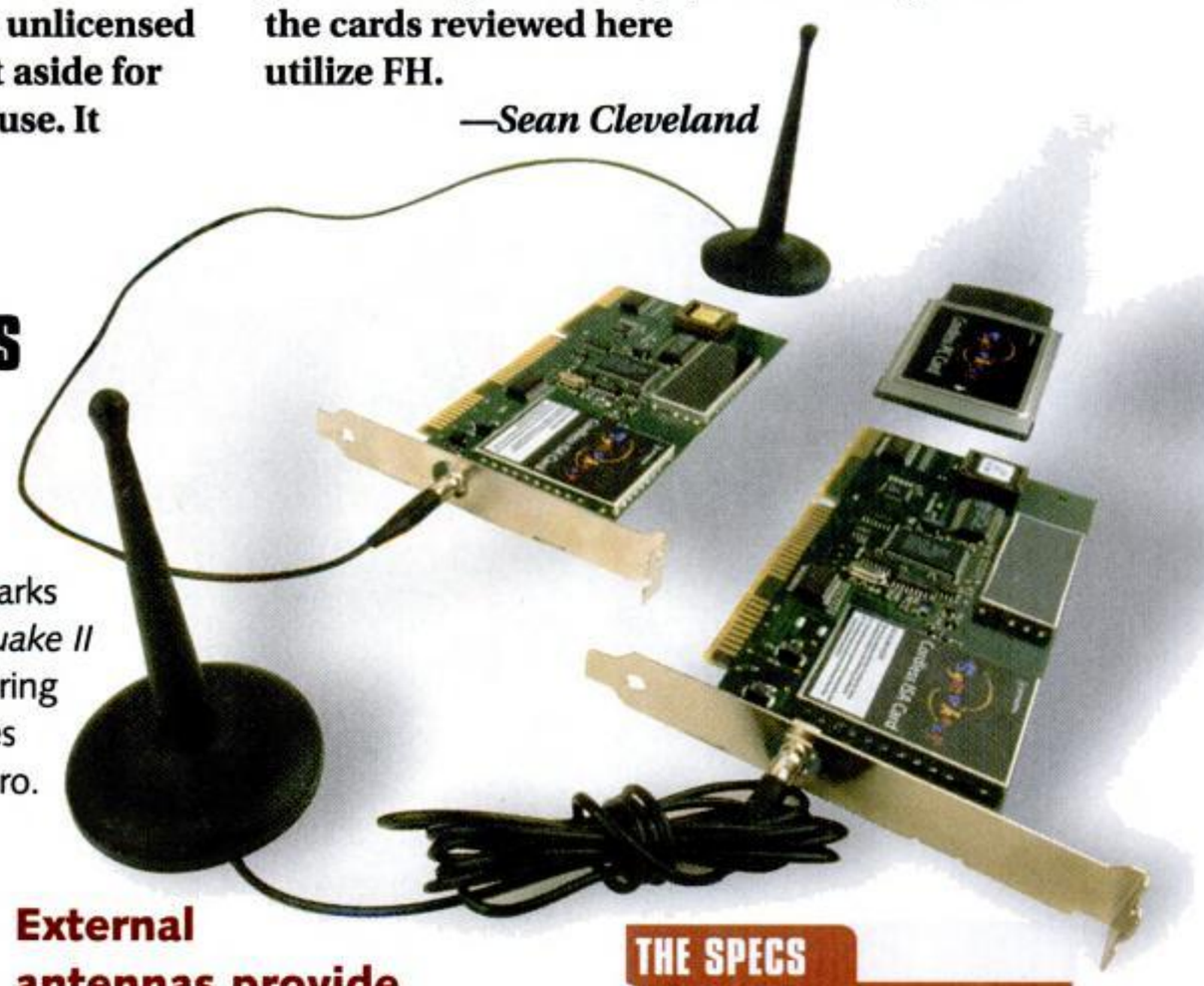
Windows is another problem. Since Win98 doesn't support routing tables, a wireless network can't see any shared drives or resources across an existing wired LAN. This should change with Windows 2000.

These wireless wonders use the unlicensed 2.4GHz global band that's been set aside for industrial, scientific, and medical use. It doesn't require an end-user license (like HAM radio) and is quite powerful and above the 900MHz frequency of most cordless telephones. This means interference is minimal. But obstacles such as reinforced walls, wrought-iron railings, and even microwave ovens create interference.

Two different spread-spectrum radio-transmission flavors are supported, each using different methods for sending data packets across the airwaves: frequency hopping (FH) and direct sequence (DS). FH is more immune to interference because the frequency is changed when interference is detected. FH also supports numerous connected machines in tight spaces better. DS provides higher throughputs and ranges. All the cards reviewed here utilize FH.

—Sean Cleveland

Proxim Symphony Cordless PC/ISA Cards



It's clear Proxim knows wireless. External antennas (with 5ft cords) make all the difference: their signal is strong, even at distances of 125ft through numerous partitions. Benchmarks performed without a hitch and our *Quake II* gaming test showed only slight lag during intense fighting. But performance pales in comparison to WebGear's Aviator Pro.

Symphony's software is it's real strength. It's sophisticated, yet easy to install. You only need to determine if the machine will be the Internet host. Proxim also offers the best security, requiring you to create a security code that other machines must have to communicate with yours.

External antennas provide excellent connectivity, while a solid software bundle supports existing networks.

Proxim's feature-rich *Maestro* software installs on each machine and offers shortcuts to drive and printer sharing, modem settings, and network status and other settings. Maestro's key feature is the ability to toggle between the Symphony wireless and existing networks. Those tied to an existing LAN can still access files (although a reboot is required). We had no problem sharing an Internet connection, although the redialing feature was touchy on remote machines.

PLUSES
- Excellent software
- Offers solution for existing networks
- Strong signal

MINUSES
- Mediocre performance

THE SPECS

FREQUENCY
2.4GHz frequency band

RANGE
Up to 150 feet

MAXIMUM COMPUTERS PER NETWORK
10

OSES SUPPORTED
Windows 95 and 98

Although Proxim does not offer a kit, We recommend Symphony to those tied to existing networks.

MAXIMUM PC VERDICT

Price $200 (PC card), $150 (ISA card), $299 (56K cordless modem), $399 (Ethernet bridge)
Company Proxim
Phone 800.229.1630
URL www.proxim.com

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DARE TO COMPARE

MANUFACTURER	PROXIM	DIAMOND	WEBGEAR
Kit Name	Symphony	HomeFree Wireless	Aviator Pro
Advertised speed / Actual speed[1] (Mb/sec)	1.6 / 0.5	1.0 / 0.4	2.0 / 1.1
BETWEEN DESKTOP AND NOTEBOOK (46 FT APART, SEPARATED BY A WALL AND A PARTITION)			
Time to copy a single 25MB file (min:sec)	09:37	21:50	02:52
Time to copy 70 documents (500K) (min:sec)	00:30	00:56	00:09
Time to copy 123 files (10MB) (min:sec)	04:58	11:11	01:17
BETWEEN DESKTOP AND NOTEBOOK (6 FT APART UNDER OPTIMAL CONDITIONS)			
Time to copy a single 25MB file (min:sec)	08:52	08:26	02:45
Time to copy 70 documents (500K) (min:sec)	00:15	00:15	00:09
Time to copy 123 files (10MB) (min:sec)	02:44	03:33	01:17
BETWEEN TWO DESKTOP MACHINES (40 FT APART, SEPARATED BY A WALL AND A PARTITION)			
Time to copy a single 25MB file (min:sec)	07:16	13:10	02:53
Time to copy 70 documents (500K) (min:sec)	00:16	00:50	00:07
Time to copy 123 files (10MB) (min:sec)	04:23	11:20	01:14

[1]Under best conditions. TEST SYSTEM: Tested on a Micron Millennia Pentium II 400MHz with 64MB.

Diamond HomeFree Wireless

Diamond usually puts out quality gear. This is an exception. The Home*Free* wireless kit qualifies as one of the worst products we've seen yet. The problem lies in its weak transmission signal, making communication between machines only feet away a trying experience. During our distance benchmark, when we propped the machines on boxes (which were already on a 4ft-high bench) and turned the antennas toward each other, we kept losing connection. Poor performance is probably due to frequency shifting because of connection loss. Even under optimal conditions, throughput is pathetic. And forget gaming, unless you actually like lag, and lots of it.

Only the install was painless. You specify during setup whether the machine will be used to host an Internet connection. This must be done on the first machine, so make sure you put Home*Free* there first. Setup concludes with verification of all connections.

All drive and printer sharing is done via Network Neighborhood. A utility called *HomeFree Assistant* checks connections and updates Internet settings. Internet sharing is done via *WinNAT* from iVasion, but its bandwidth is atrocious.

Diamond has released numerous driver revisions, but they've only addressed stability—not performance.

Diamond should have taken Proxim's lead and included an external antenna. Perhaps their connectivity and throughput issues wouldn't have been so bad.

PLUSES
- Install was easy
- Software works

MINUSES
- Weak signal
- Very poor performance
- Many dropped data packets
- Easily loses connection
- Way too much game lag

THE SPECS

FREQUENCY
2.4GHz frequency band

RANGE
Up to 150 feet open air

MAXIMUM COMPUTERS PER NETWORK
8

OSES SUPPORTED
Windows 95 and 98

MAXIMUM PC VERDICT

Price Desktop Pac: $200 (ISA & PCI card), Combo Pac: $230 (ISA & PC card), $130 (single PC card), $100 (single ISA or PCI card)
Company Diamond Multimedia
Phone 800.468.5846
URL www.diamondmm.com

2

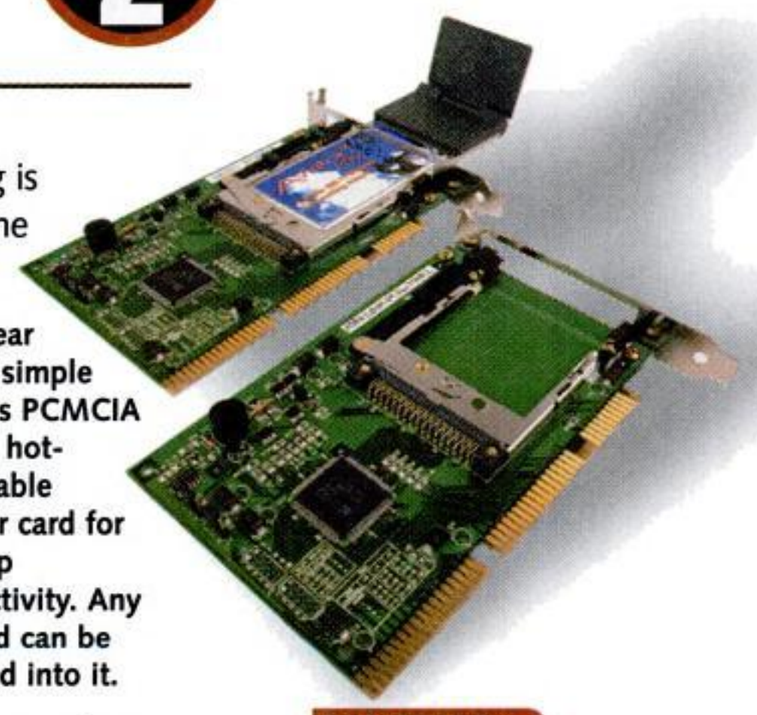
WebGear Aviator Pro Wireless Networking Adapters

MAXIMUM PC KICK ASS! product

The Aviator is the most powerful wireless solution in this roundup. It sailed through our benchmarks with ease, and signal degradation was virtually nonexistent, even at extreme distances. This may be because WebGear put all its technology into its PC card, using only a simple ISA-bus PCMCIA adapter card for desktop connectivity. Any PC card (modem or otherwise) can be plugged into its Type II hot-swappable port.

The full setup disc wasn't ready at press time, but we were told it's exactly like WebGear's current parallel-port install. Basically, setup asks for a unique computer name and a workgroup name to be used across the network. These are transferred to the network properties, and drive and printer sharing is enabled. TCP/IP is also installed using the addresses shown in the sidebar (you specify the last digits of the IP address via a dialog box).

We found this kit lightning fast and robust. Transmission signals were always strong, and gaming delivered no lag, even during extreme fragging. And unlike other kits, the Aviator Pro can see Windows NT resources and shares that are maintained via an NT Server. We highly recommend the Aviator Pro for the home and those who don't need to access other existing network resources, except of course if it's pure NT.



WebGear uses a simple ISA-bus PCMCIA Type II hot-swappable adapter card for desktop connectivity. Any PC card can be plugged into it.

PLUSES
- Ability to see NT resources
- Strongest signal of all kits
- Best benchmark scores

MINUSES
- Can't switch between existing networks
- Could never attain maximum speeds

THE SPECS

FREQUENCY
2.4GHz frequency band

RANGE
Up to 500 feet

MAXIMUM COMPUTERS PER NETWORK
60

OSES SUPPORTED
Windows 95 and 98
Windows NT 4.0

MAXIMUM PC VERDICT

Price $125 (PC card), Free with proof of purchase (ISA card)
Company WebGear
Phone 877.932.4327
URL www.webgear.com

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Apple Power Macintosh G3

Keeping up with the Intels

Apple's 400MHz G3 keeps pace with the fastest 500MHz Pentium III.

PLUSES
- 64-bit PCI slots
- Fast Photoshop and Premiere times
- Cool case design
- Uses new copper-based technology
- Good 2D

MINUSES
- No removable media
- No FireWire software
- Only one 3.5-inch expansion bay
- Expensive
- No software bundle
- Mediocre CD-ROM
- No DVD
- Crap mouse
- Crap keyboard
- Crap internal speaker
- Crap FM sound

By adding killer features such as 64-bit PCI slots, FireWire, a phat 400MHz copper-based processor, and the ability to jack your RAM up to 1GB, Apple has created a graphics workstation that keeps up with the fastest Intel systems. Unfortunately, the new G3 cuts corners on parts, and costs about $400 more than a top-of-the-line, tricked-out Pentium III system.

Getting inside the box is now easier than popping your car's hood. Just put your finger in the hole at the top of the box and pull down. Inside, you'll find a 400MHz socket-based CPU with 1MB backside L2 cache, 128MB SDRAM, an ATI Rage 128 (with 16MB video SDRAM), a 9GB 7,200RPM Ultra 2 SCSI hard drive, and a 24x CD-ROM, all running on a 100MHz system bus.

Our performance chart shows the G3 beating the Dell XPS T500 (a $2,599—without monitor—Kick Ass machine reviewed in our March 1999 issue) in our *Photoshop* and *Premiere* tests. This can be attributed to the G3's 1MB backside cache (as opposed to Dell's 512K L2), which aids in swapping data from the CPU to memory to disk. But we got the *Photoshop* numbers by jacking up the application's memory configuration by 50MB above the default. Before tweaking the application's RAM, *Photoshop* timed in at 79 seconds. The Dell had better floating-point performance, beating the G3 by eight seconds in the *Inspire* render test. And Apple's 24x CD-ROM couldn't keep up with the Dell's 4.8x Toshiba DVD-ROM, coming in 33 seconds slower in a 250MB file-transfer test—not good if you're a graphics professional ripping images off CDs all day.

Graphically, ATI's Rage 128 spit out impressive framerates during our *Quake* benchmark (89.8fps), but did not beat Dell's TNT (103fps). Initially, *Quake*'s graphic quality was deplorable. Image quality improved only after we scoured the Internet and found the latest *Quake* and ATI drivers. 2D performance is on par with a basic TNT, topping out at an impressive 1920x1080 at 72Hz and millions of colors. Too bad the Apple monitor can handle only up to 1600x1200@60Hz.

While the G3's graphics are well and good, we still don't like a few things about the system. Like the iMac, you get no removable storage, and that same crappy mouse and keyboard. If you want to add removable media, a floppy or Zip drive are about the only two things you'll find to fit in the one available 3.5-inch bay. And speaking of drives, the way the CD-ROM drive opens up is ridiculous. When you eject a CD, the CD tray pushes a hinged blue panel outward, revealing a beige CD-ROM underneath.

We're glad Apple finally instituted its well-respected FireWire standard (IEEE 1394 to PC users), but can't believe the bundle didn't include any software to take advantage of it. We tested the FireWire capabilities using Digital Origin's *MotoDV* beta G3 drivers and it worked as advertised.

The only other nit-pick we had was with our out-of-box experience. The machine crashed on boot up, informing us we needed to turn off all our extensions and try again. By trial and error, we found which extension was causing the problem, but only after restarting the machine more than 10 times.

The new G3s are definitely faster than their 300MHz Power Mac counterparts. Current Mac users/PCphobes who need to upgrade will appreciate the power the box delivers. But, if you're torn between buying a new G3 and a new P-III PC with TNT, you'll get similar performance and more features for less money with the P-III.

—Rick Popko

UNDER THE HOOD

THE BRAINS

CPU	G3 400MHz
L2 Cache	1MB 200MHz
RAM	128MB 100MHz DRAM, upgradable to 1GB
Motherboard	Apple
Drive bays	One 5.25-inch (filled), one 3.5-inch (free)
I/O ports	Mic in, speaker out, two USB, two FireWire, one serial, one 10/100BaseT

DISPLAY

Video	ATI Rage 128 with 16MB SDRAM
Monitor	Apple 17-inch, 16.5-inch viewable
Res/Refresh	1600x1200/60Hz

STORAGE

I/O	Adaptec AHA 2940U2 SCSI
Hard Drive	IBM 9GB DDRS-39130 7,200RPM
CD/DVD	Apple 24x CD-ROM
Removable	None
Fax/Modem	Ethernet 10/100BaseT

SOUND

Sound	Crystal CS4211-km chipset on motherboard
Speaker	Generic built into the machine

THE BUNDLE

None

BOOT 1:11 DOWN 0:05

MAXIMUM PC VERDICT

Price $2,999 (plus $499 for 17-inch monitor)
Company Apple Computer
Phone 800.538.9696
URL www.apple.com

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REAL-WORLD BENCHMARKING

	APPLE G3 400MHZ	DELL DIMENSION XPS T500
Quake (fps)	89.8	103
Premiere	66 seconds	71 seconds
Photoshop	60 seconds	65 seconds
Inspire	445 seconds	437 seconds
CD-ROM	138 seconds	105 seconds

Methodology: *Quake* is used to test the CPU and graphic card performance. In *Premiere*, we took two 10-second clips, placed a cross dissolve between them and timed how long it took to render a QuickTime movie. *Inspire* is extremely floating-point intensive To test CD-ROM data transfer times, we dragged 250MB of files from the *Inspire* CD to the hard disk and timed how long it took to copy the files over.

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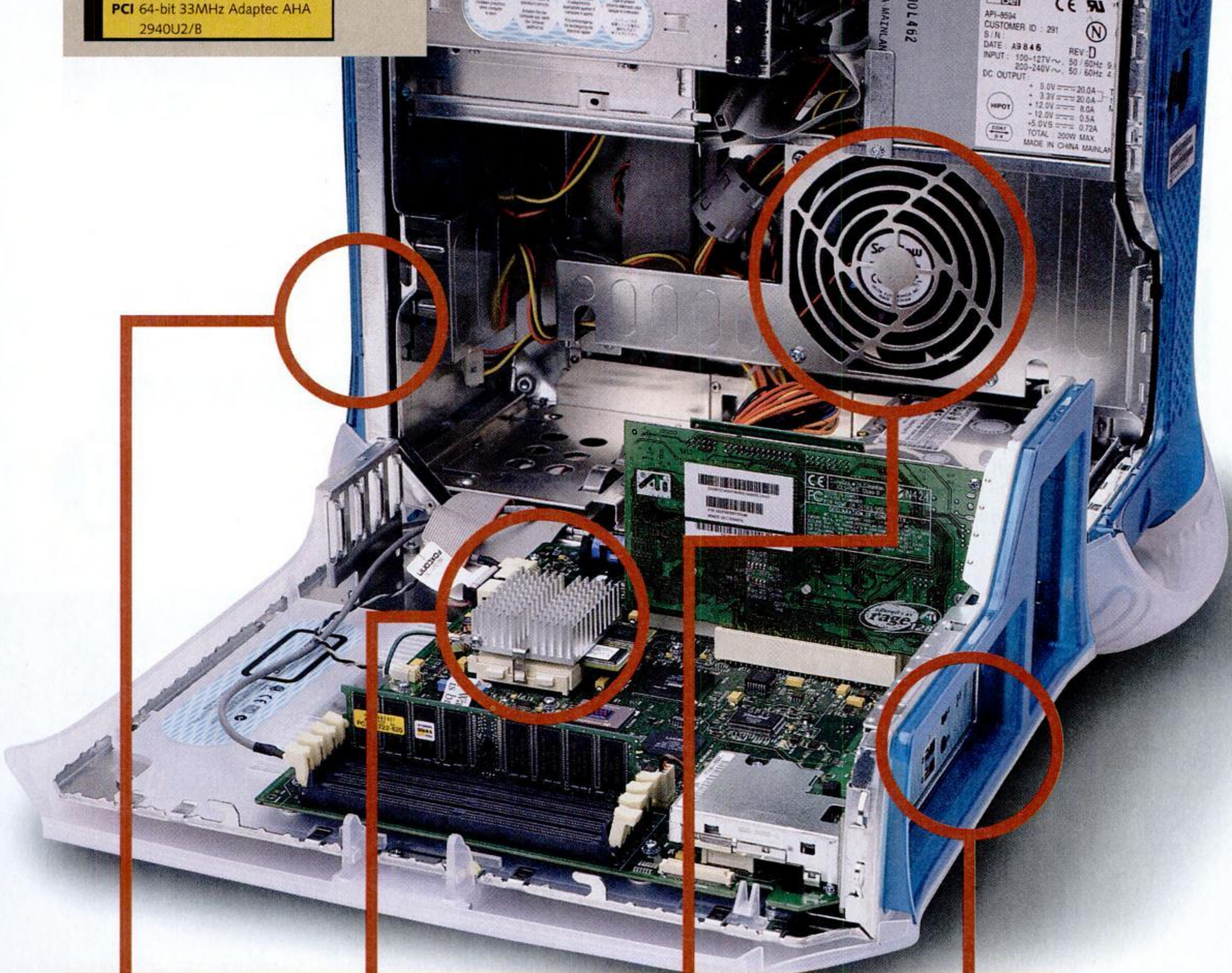
EXPANSION NOTES

The new G3 has a little room to grow. The 400MHz machines come with four full-length PCI slots (two free) and one free 3.5-inch drive bay for a Zip or floppy. Anything larger than 3.5-inch will require the peripheral to hang outside the box.

EXPANSION MAP

PCI 32-bit 66MHz ATI graphics
PCI 64-bit 33MHz free
PCI 64-bit 33MHz free
PCI 64-bit 33MHz Adaptec AHA 2940U2/B



Sound off As further evidence of its corner cutting, Apple includes only a silver-dollar-sized mono speaker that sounds like your audio is coming out of a tin can.

Socket to me The G3's copper-based technology allows chips to be smaller, draw less energy, and produce less heat. They're also cheaper. So why does the G3 cost $400 more than a top-of-the-line Dell?

That's one phat fan There's no question that Apple knows how to design a case. To keep the internal components cool, Apple slapped in a 4.5-inch fan with a 2-inch sheet-metal partition alley that effectively sucks the heat out the back.

Bird on a FireWire It's about time Apple included FireWire jacks on its computers. It's Apple technology after all. The bad news is you don't get a utility to take advantage of it.

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Baldur's Gate

You down with RPGs?

Baldur's Gate, an isometric-perspective RPG, breathes new life into the tired Dungeons and Dragons titles. Set in the world of the Forgotten Realms, *Baldur's Gate* is a nonlinear adventure of epic proportions.

Packed on five CDs filled with engaging music, clever banter, and meaty gameplay, *Baldur's Gate* quickly sucks you into its alternate world. BioWare's proprietary engine delivers gameplay that looks and feels similar to Blizzard's *Diablo*, but has far more spells, monsters, magical items, and NPCs. While the game is filled with uninspired pixel-based characters, the glorious pre-rendered backgrounds make up for that shortcoming. The point-and-click interface is intuitive, making it easy for first-time RPGers to jump in feet first.

On your journey, you'll run into 25 different NPCs who'll offer their services, leading you on quests and subplots. The AI is such that NPCs will abandon you if your actions go against their alignment, or applaud when they concur with your choice.

The only gameplay flaws involved the NPCs' pathfinding skills and monster reactions. In one instance, the AI had NPCs navigating their own way to destination points in dungeons instead of following your lead. And offscreen monsters idly stand by as their comrades are mowed down. Hardware-wise, you don't need a 3D accelerator for this 2D game; however, the game tends to slow way down on lower-end systems when the screen fills up with activity.

Baldur's Gate's penchant for customizability, replayability, and fluid story lines makes this game an instant classic.

—Kenn Durrence

Watch as your enemy's bodies rain down upon you in a shower of bloody chunks.

THE SPECS

MULTIPLAYER
- TCP/IP
- IPX
- Modem

PLUSES
- Friggin' huge game world
- True to D&D
- Great ambience

MINUSES
- Suspect AI
- No zoom feature
- No multi-angle camera

MAXIMUM PC VERDICT

Price $50
Developer BioWare
Publisher Interplay
Phone 949.553.6655
URL www.interplay.com

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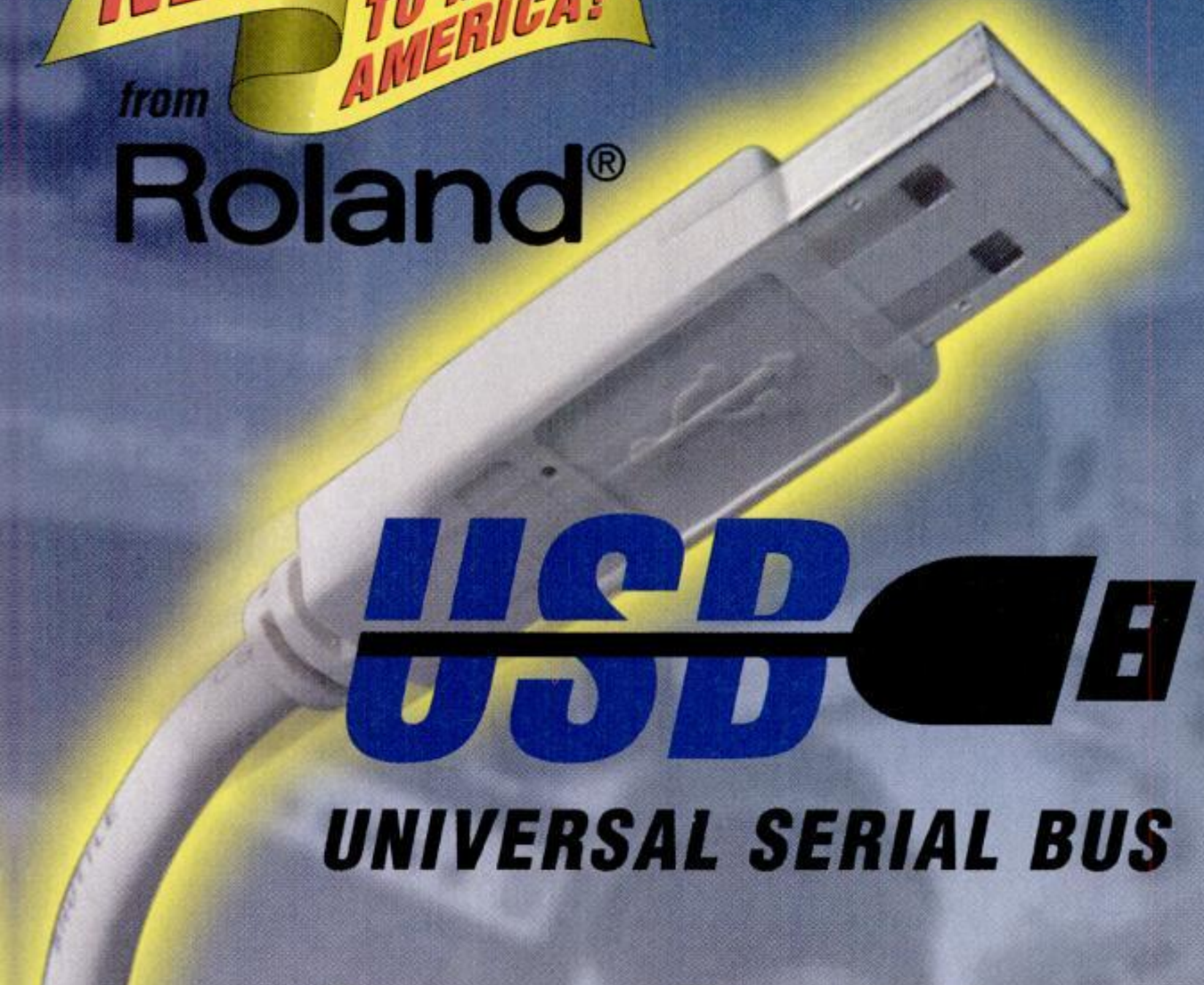

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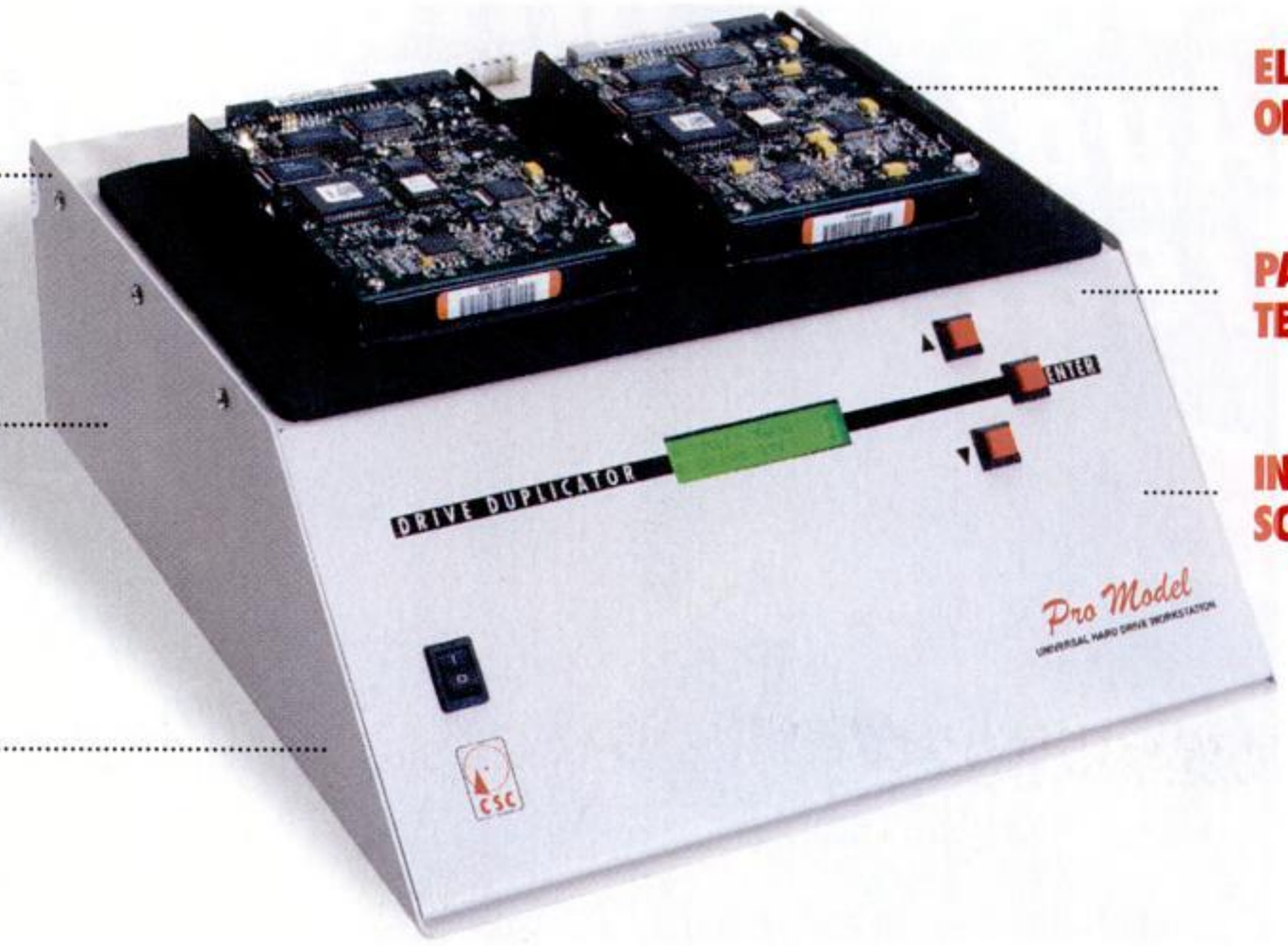

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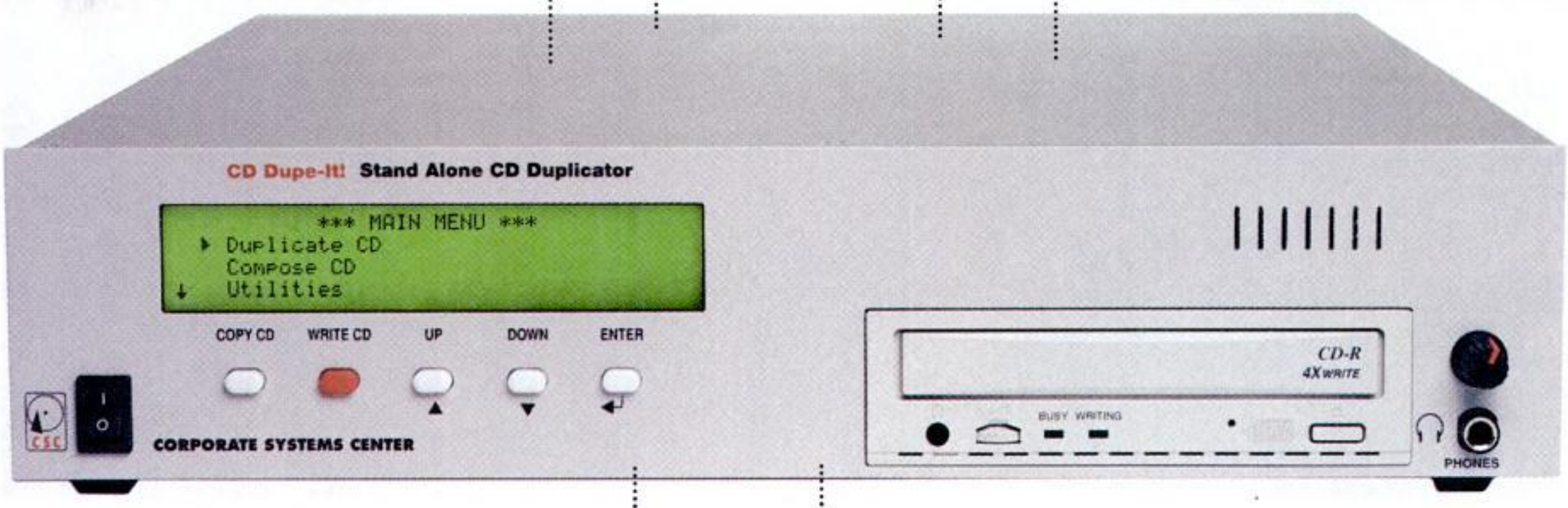

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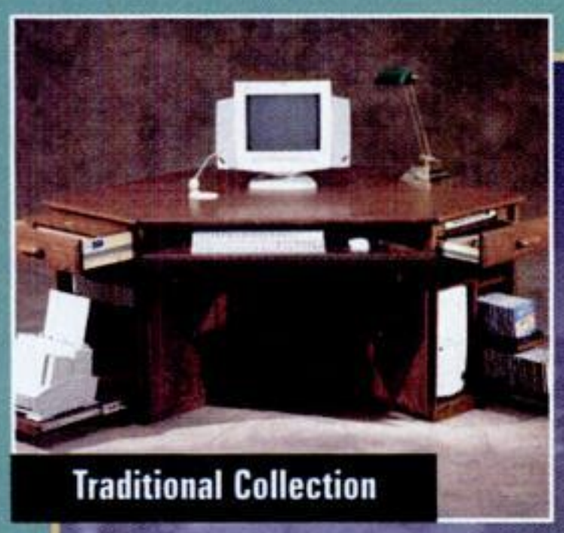

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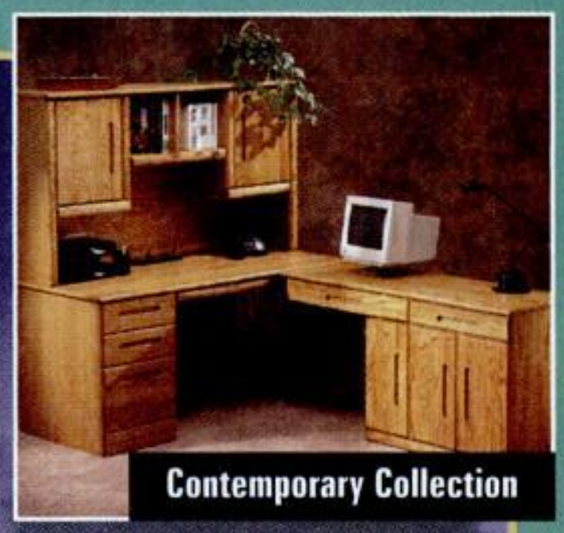

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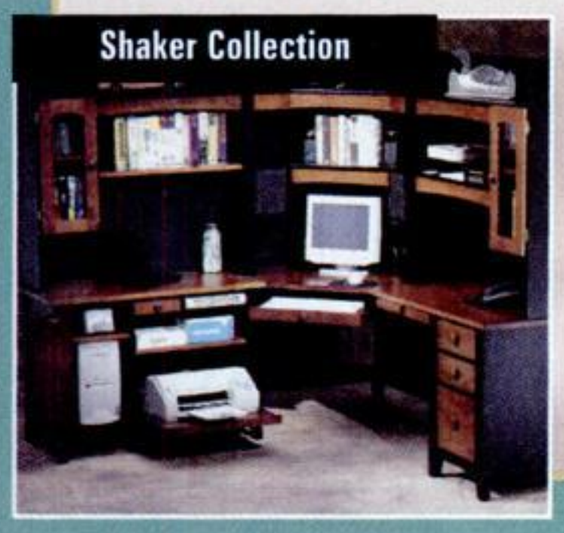

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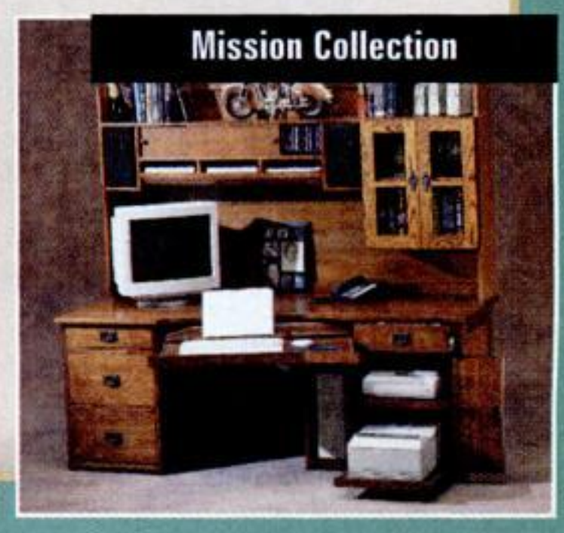

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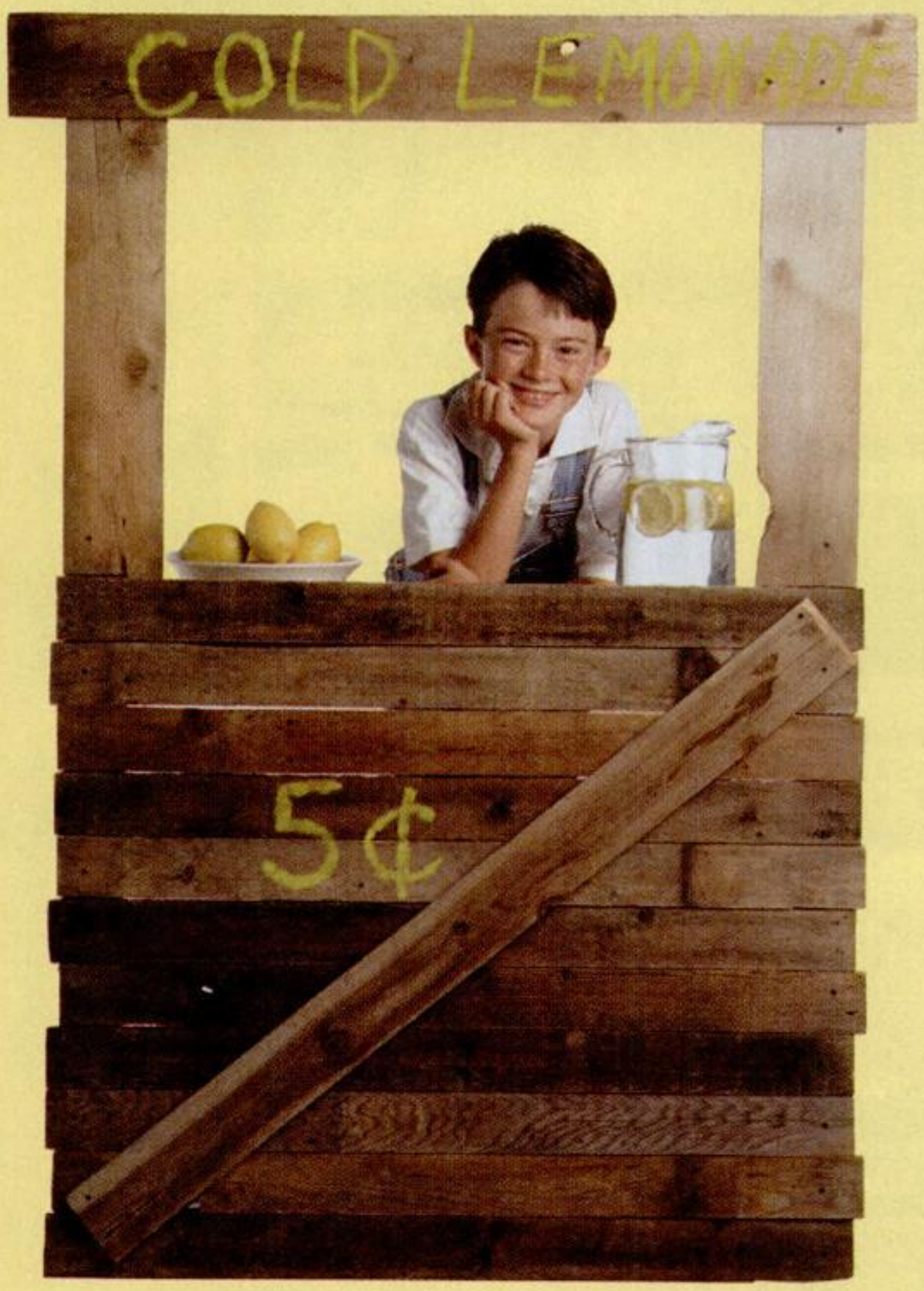

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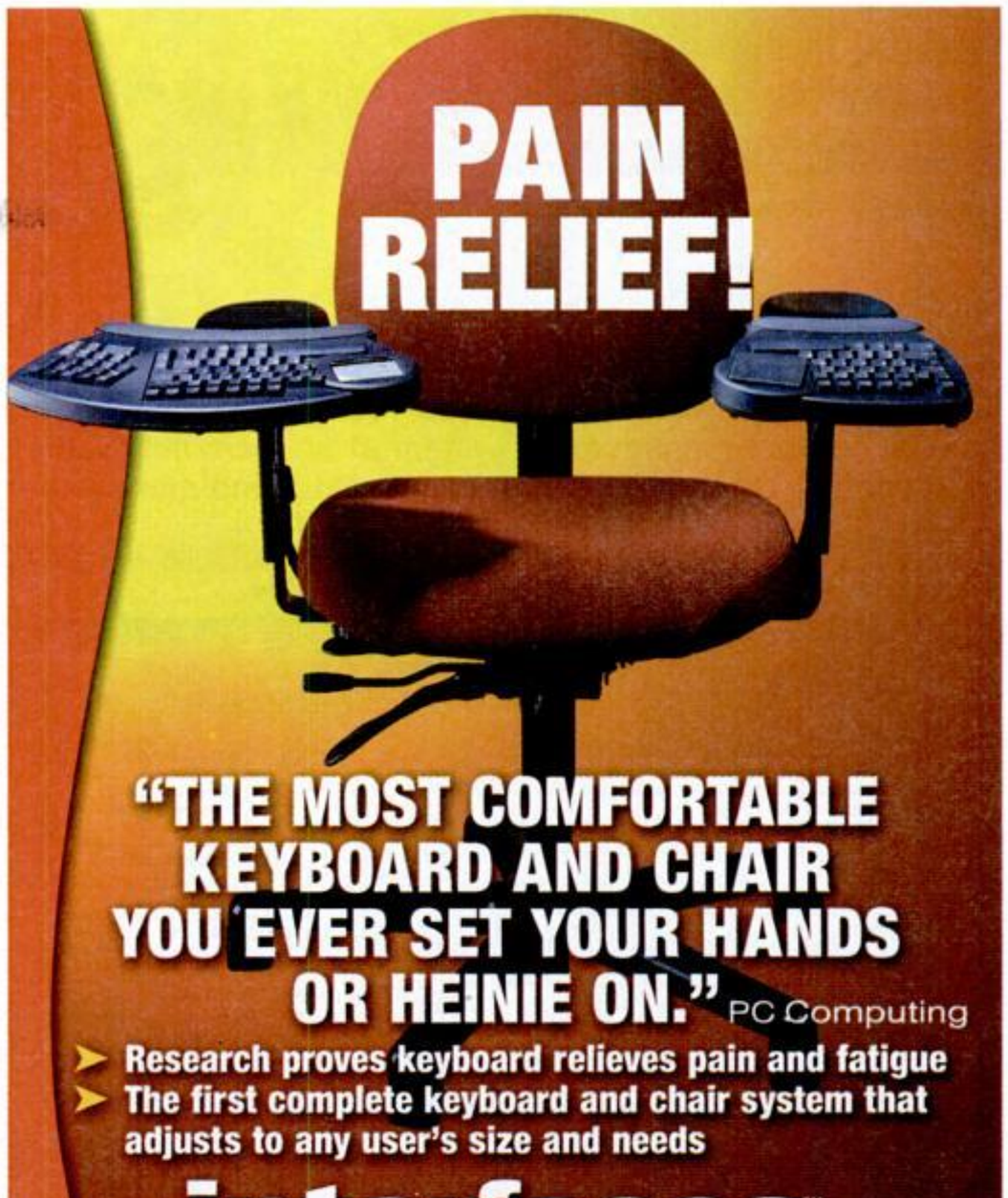

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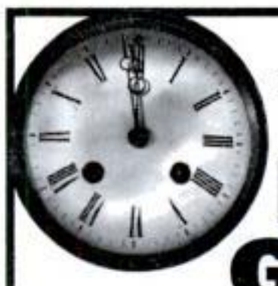

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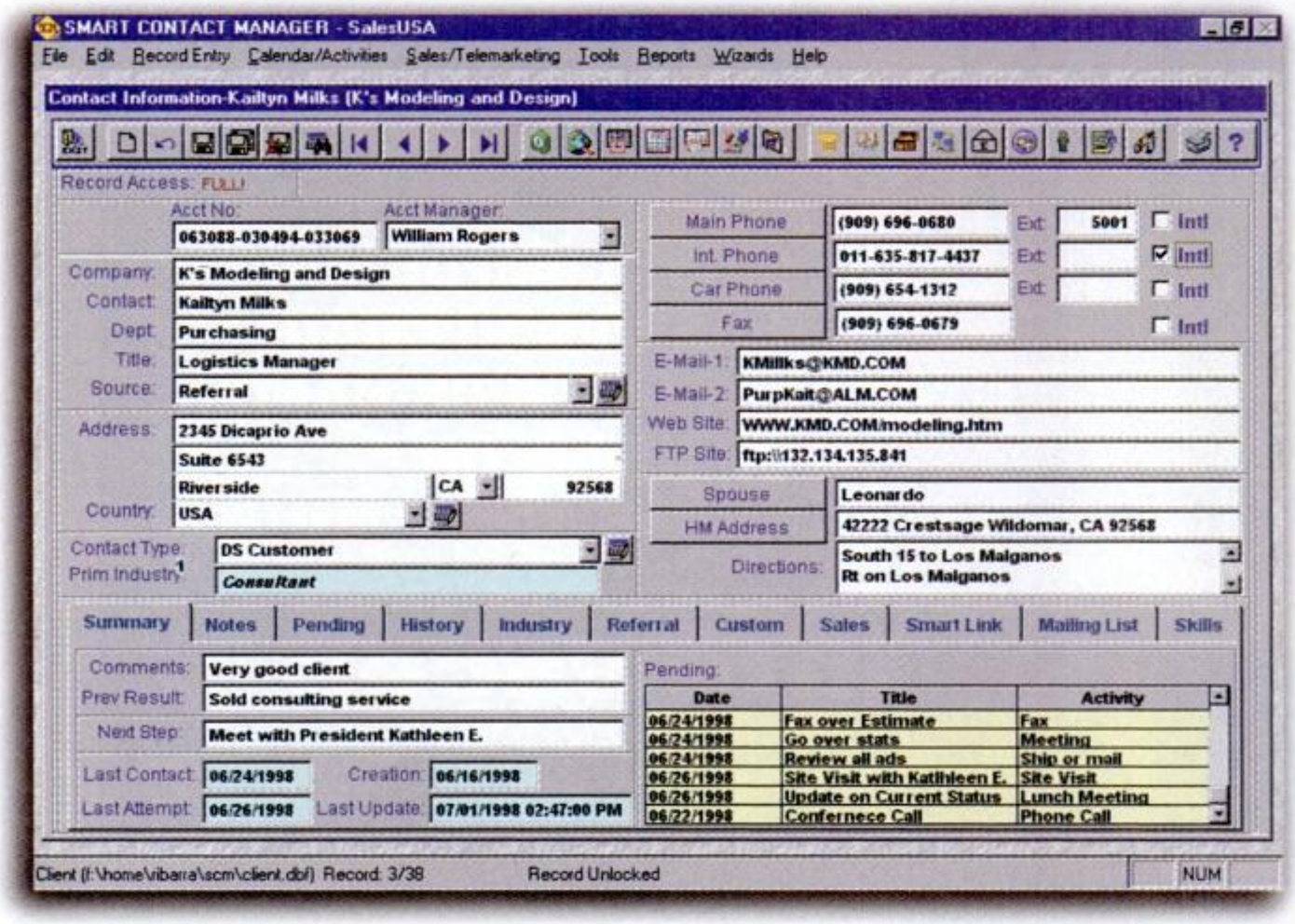
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06/24/1998 | Fax over Estimate | Fax
06/24/1998 | Go over stats | Meeting
06/24/1998 | Review all ads | Ship or mail
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TERMINATOR

Tech Terms Revealed ▶

Technical terms found throughout MAXIMUM PC are underlined and in blue. Hyperlink back to here for revelation and further explanation. Terms appearing in **blue** within the Terminator are updated definitions of previously explained concepts.

A

Accelerated Graphics Port AGP is an expansion bus developed by Intel specifically for the videocard subsystem. It operates independent of the PCI bus and normally runs at 66MHz (i.e., 1x). Whenever you see multipliers attached to AGP, such as 2x or 4x, they are referring to how much faster the bus will run—2x means 66MHz x 2, or 133MHz.

AGP see Accelerated Graphics Port

alt Alternate. In web authoring, a tag in the code that tells the browser what text to display in place of a graphic that does not load or is turned off. In some browsers, this information is also displayed when the pointer is positioned over the graphic.

API Application programming interface. A collection of subroutines—usually part of an operating system—that application programs can call upon to perform common tasks. For example, a program might call an API routine to display a window on the screen. APIs reduce the amount of code programmers have to write.

API extension An Application Program Interface (API) extension refers to an enhancement or add-on to an existing API. Creative Labs' EAX works with Microsoft's DirectSound and DirectSound3D API, making it an open standard.

B

backside bus A special interface that connects a microprocessor to a Level 2 (L2) cache. No other system device shares the backside bus. This contrasts with the frontside bus, or system I/O (input/output) bus, which many system devices typically share. A backside bus helps eliminate performance bottlenecks.

backside cache A feature of the G3 processor card that allows your computer to access L2 cache faster and more efficiently because it is a part of the processor card itself. When you install a processor card with backside cache, any motherboard cache present becomes "L3 cache".

bandwidth The amount of data that can be transmitted in a fixed amount of time. Bigger is better. For digital devices, the bandwidth is expressed in bits per second (bps) or bytes per second. For analog devices, the bandwidth is expressed in cycles per second, or Hertz (Hz).

batch process A macro that allows you to process several selected files or folders the same way at once.

bitmap Bitmap graphics, sometimes referred to as raster images, are static graphics, animations, and fonts created as a series of individual pixels or points that can be edited one at a time.

blue screen of death Slang to describe the Fatal Exception Error screen that appears after a full-blown system crash.

broadband A type of data transmission that can accommodate multiple channels at once over a single medium (such as wire). Cable TV, for example, uses broadband transmission to send multiple channels over a single cable.

bus A data channel connecting two or more parts of a computer. The expansion bus, for example, is the conduit through which PCI cards share data with the CPU and system memory.

C

cache A dedicated or reserved bank of memory that is used to improve your computer's performance. It provides a temporary storage area for instructions and data that acts as a fast swap to and from your CPU. The larger the cache, the greater the performance.

Category 5 cable Eight-wire cabling commonly used to connect local-area networks. The standard that supports 100Mbps data throughput.

CompactFlash Portable memory format that is read, via adapter, in PC card drives.

D

data packet A piece of a message transmitted over a packet-switching network. A packet contains the destination address in addition to the data. Data packets are often called datagrams in IP networks.

DIP switch Dual Inline Package switch. A tiny switch that manually controls some function of a computer device. DIP switches are often found on disk drives, printers, and motherboards.

Direct3D A subset of Microsoft's DirectX Application Program Interface. This interface allows developers to use hardware acceleration for 3D graphics, which helps games run faster by offloading the 3D processing onto a dedicated piece of hardware.

DVD Digital Versatile Disc. It's the next-generation CD-ROM, storing more data per disc, and also a possible replacement for videotapes, especially in the rental business. By using multiple layers and both sides of a disc, DVD can store 4.7GB to 17GB of data, while CDs are limited to a maximum of 682MB.

E

EIDE Enhanced Integrated Drive Electronics. A motherboard interface for connecting hard drives, CD/DVD-ROM drives, and removable storage devices.

embedded software A computer program that runs inside a non-PC device, such as an appliance, an industrial machine, or a vehicle. Usually the device stores the program in a ROM or Flash ROM chip.

Ethernet A networking protocol that supports 1,024 nodes at 10Mbps throughput via twisted-pair, coaxial, and optical fiber cabling. The Fast Ethernet protocol increases throughput speed to 100Mbps.

F

FAT A DOS- and Windows-based file system that tracks the location of data on a disk using File Allocation Tables (FAT), which are simply tables of numbers that indicate the status of a cluster or the location of the cluster belonging to a file. A directory table is used to track file names, extensions, date, and other info, including where the FAT address of where the file starts. When a file is requested, the table is checked, and the cluster containing the file is located. The address of the next cluster is also located if the file is larger than a single cluster, until an END OF FILE designator has been reached. A FAT entry of 0 indicates that the cluster is free to be written to. DOS actually writes two FATs to a logical volume where the second is used to replace the primary in case it becomes damaged.

FAT16 A 16-bit DOS and Windows file system (see FAT) that varies cluster sizes based on hard drive size. Cluster sizes range from 4K (for drives up to 127MB), to 4K (255MB drives), 8K (511MB drives), 16K (1GB drives). and 32K (for drives up to 2GB). The ultimate capacity of a FAT16 partition is 2GB.

FAT32 A 32-bit file system that was introduced with Windows 95 OSR2 that uses 4K cluster sizes for all drive sizes with a maximum capacity of 8GB.

FireWire IEEE 1394, as it's commonly referred to, was conceived by Apple Computer and then developed within the IEEE 1394 Working Group. The spec allows for the transport of data up to 200Mbps, the ability to add and remove devices without powering them down first, and the ability daisychain up to 63 devices with cable lengths up to 14 feet.

floating-point A fractional number, such as 9.95 or 98.6. Computers have a more difficult time working with floating-point numbers than they do with integers (whole numbers), but the higher precision of floating point is required for some operations.

FP see floating point

H

hot swappable The ability to add and remove devices to a computer while it is running and have the operating system automatically recognize the change. The Universal Serial Bus (USB), IEEE 1394, and PCMCIA standards support hot plugging.

I

IEEE 1394 Also known as FireWire in the Macintosh market. A high-speed bus protocol that transfers data at up to 400Mbits per second. 1394 is a great interface for digital video peripherals and may someday be used for high-speed modems.

imagemap A web image with multiple associated links instead of just one. Image maps can be built as both "client side" (the browser supports the code to define where users can click) or "server side" (the web server supports the code to define where users can click). All 3.0 browsers and later support client-side imagemaps, which is recommended.

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The extended Terminator (with terms not found in this issue of the magazine) is found 24/7 online.

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IP address A unique number that identifies a PC or some other device on a network. (IP stands for Internet Protocol.) Every computer attached to the Internet has an IP address, although it's common for multiple computers to share a pool of addresses.

L

LAN Local Area Network. A private computer network within a building or a local group of buildings. Most LANs are wired with cables hidden in walls and ceilings, although wireless connections are also available.

Level 2 cache The second-fastest memory available to a microprocessor (second only to the Level 1 cache). It usually consists of SRAM chips near the processor, although some recent processors have on-chip L2 caches. Also known as secondary cache.

Local Area Network see LAN

M

microcontroller A small microprocessor chip that's found inside a non-PC device, such as an appliance, an industrial machine, or a vehicle. Often, microcontrollers are older CPUs that are no longer considered powerful enough for desktop computers.

MIS Management of Information Systems. It's the department that installs and maintains computers at medium- to large-sized companies. Also known as the IT (information technology) department.

MMX Unofficially it stands for Multimedia Extensions, though Intel insists it's just a brand name. Introduced in early 1997, MMX consists of 57 new instructions that speed up some multimedia tasks in x86-compatible microprocessors. It's also supported by chipmakers AMD, Cyrix (National Semiconductor), and Centaur Technology (IDT).

N

NPC Nonplayer character. In gaming parlance, a character that affects the outcome of a game but that is not played by a participant in the game.

O

OpenGL Open Graphics Language. An easy-to-use (for programmers anyway) graphics API created by Silicon Graphics. It's generally accepted in the high-end workstation market. In the Windows 9X world, OpenGL plays David to Microsoft's Direct3D Goliath or vice versa. It's a Chevy versus Ford debate with both sides locked and loaded.

OpenGL ICD OpenGL Installable Client Driver. The original OpenGL driver model. Partial implementation allows a 3D accelerator to run OpenGL-accelerated 3D games (e.g., *Quake II*). Full implementation allows the card to support OpenGL acceleration in 3D rendering applications (e.g., *3D Studio Max*).

P

packet storm A network problem caused by a faulty device that won't stop broadcasting useless data over the network. (Packets are bundles of binary data.) Packet storms can slow down network traffic until someone shuts off the faulty device and corrects the problem.

PCMCIA Personal Computer Memory Card International Association. Portable device standard most commonly used in notebook PCs. Now more commonly known as PC card.

PCMCIA Type II Personal Computer Memory Card International Association. Small credit card-sized devices used mostly in mobile applications for such things as modems, hard drives and RAM. Also referred to as PC card. Type II calls for a maximum thickness of 5.5mm.

peer-to-peer networking a simple way of connecting multiple computers together without a central server. Each computer on the network is "equal" or a peer to every other computer. It's a convenient way to share files, printers, and other resources.

R

RAID Redundant Array of Independent Disks. RAIDs are stacks of hard disk drives usually found in servers. They protect important information by redundantly storing it on multiple drives, so the failure of a single drive won't lose any data. Disk striping, a method that interleaves bytes or groups of bytes across multiple drives allows more than one drive to be read and written to simultaneously, increasing the data rate by almost a multiple of the number of drives used. Fault tolerance uses the same method, although the data is duplicated onto another drive (called mirroring). Parity calculates the data in two or more drives and stores the result onto a separate drive that is connected but not used by the system.

RAMDAC Random Access Memory Digital to Analog Converter. The chip on a videocard that converts the bits of a digital image into an analog signal. It maintains the color palette and determines refresh rates. The faster the RAMDAC MHz, the higher the refresh rate your system can handle.

rollover Effect in digital media where one image is replaced with another when a hot spot is entered by the mouse cursor. An example is a button that lights up when you move the mouse onto it.

S

SCSI Small Computer System Interface. Pronounced "Scuzzy." A standard high-speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI). It is an interface like IDE that allows up to seven peripheral devices to be linked to a single controller. It is perfectly suited for true multitasking environments such as Unix and Windows NT with its ability to manage large storage devices such as hard drives and access its devices concurrently. It comes standard on most Macintosh, but requires an expansion board, or host adapter, in most PCs.

SDRAM Synchronous Dynamic Random Access Memory. A faster type of memory that synchronizes with the CPU. Its architecture allows it to run fast enough to handle the 100MHz system bus.

server A computer that provides resources to client computers over a network. Usually a server stores applications and data files for access by clients. Some servers run large programs (such as database managers) and send results of queries to the clients. web servers store web sites for access over the Internet.

SLI Scanline Interleave. A feature that allows two 3D accelerator cards to run in parallel. Each handles every other line on the screen. It dramatically increases speed but at the cost of more hardware.

slice In *Fireworks*, an area of a graphic that has been defined as a table cell to be reassembled by a web browser is called a slice. Slicing is the process of "cutting up" a larger graphic into smaller pieces, which can then be saved with various compression methods and reduces the overall file size and browser load time.

SRAM Static Random Access Memory. A very fast type of memory chip that's often used for Level 2 (L2) cache and video memory because of its speed. However, it's too expensive to use for main memory, which usually consists of slower DRAM (Dynamic Random Access Memory). SRAM is faster than DRAM because it doesn't have to be constantly refreshed to retain its data.

status message In web authoring, the text that will be displayed in the status bar at the bottom of a web browser to help a person navigate the site or gain more information about an item before selecting it. A common status message is one that tells you the location of the next page when you roll over a hyperlink.

SuperDisk A successor to the floppy disk drive, the SuperDisk offers 120MB of storage capacity, faster speeds, and backward compatibility with legacy 1.44MB and 720K media. The SuperDisk can also be used as a bootable device.

swap images In web authoring, a JavaScript function that tells the browser which graphic or area of a graphic will be "swapped" with a new graphic when a rollover is selected.

system bus The pipe that sends data back and forth between main memory and the CPU.

system I/O bus The main input/output bus on a microprocessor. It's the interface that connects the CPU to most other system devices, such as main memory (RAM), PCI devices, the AGP card, the system chipset, and often the Level 2 (L2) cache. Also known as a frontside bus.

T

target In web authoring, code that tells the browser what window to go to when a hyperlink is selected by the user. For example, the target "_blank" tells the browser to launch a new window, rather than going to a new page in the current window.

TCP/IP Transmission Control Protocol/Internet Protocol. These are international standards that govern how computers can send information over data networks. The Internet is an example of a network that uses TCP/IP. Local-area networks (LANs) may use different standards.

TFT Thin Film Transistor. The essential component in any modern LCD notebook or flat-panel display.

U

URL Universal Resource Locator. The text or IP address typed into a web browser used to locate a specific server.

USB Short for Universal Serial Bus. A new, faster, digital I/O port proposed by Intel for motherboards. Taking up far fewer resources, this port can act as a serial, parallel, mouse, keyboard, joystick, and even speaker interface. Unlike other communication ports on a PC, USB can be daisy-chained up to 127 devices.

V

vector Vector graphics are static graphics, animations, and fonts created as mathematical descriptions, consisting of a collection of lines, curves, and shapes.

vector-based Graphics, text, or images composed of bezier curves. These images are resolution independent and scale to the resolution limits of the output device, as opposed to raster images (such as bitmaps) that are fixed resolution.

Y

You Well-educated technofile reading *Maximum PC* at a cluttered desk with a sporty new Pentium II 450 pumping hot polygon action to your monitor. You're hot and bothered as you scour the pages for the lowdown on all the hi-tech terms bandied about the magazine.

Me Just the term you're looking for. Let's get together.

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Coming Next Month...

MAXIMUM PC VIDEOCARD EXTRAVAGANZA

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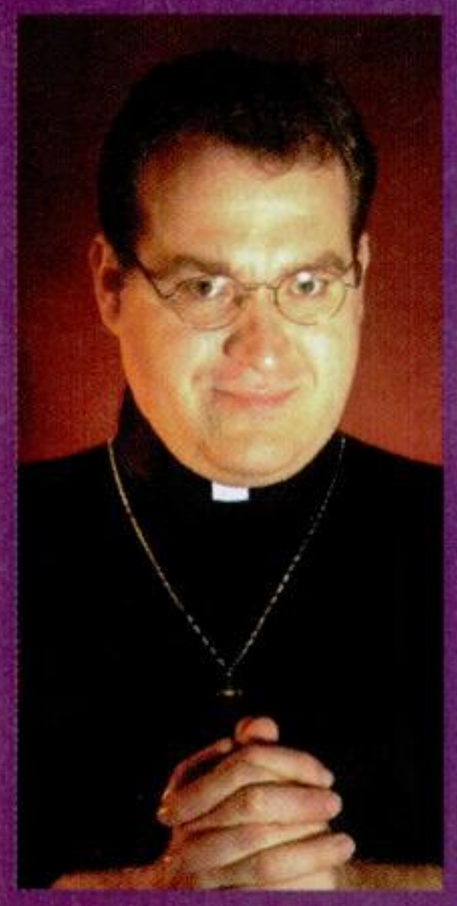

ALEX ST. JOHN was the architect of DirectX while an evangelist at Microsoft. Since leaving the empire, he has remained a player, brokering many deals in the industry. Reach him at **saint@maximumpc.com**.

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I Miss My Hummer

DOING THE EMPIRE'S BUSINESS IN *THE* OFF-ROAD VEHICLE

Back at the Empire, when a young nerd vests his first few options, an unwritten rule dictates that he run out and blow the windfall on a new Porsche or Ferrari. In fact, quite a few "rugged individualists" on campus express their new-found wealth by buying an expensive sports car.

I enjoyed working at Microsoft immensely, but many aspects of its yuppie culture revolted me, and this was one of them.

Around the time Microsoft first discovered the Internet, and Gates sent his historic e-mail signaling the assault on Netscape, I decided on a Humm-V. Not a sleek clean black or gray one, like some of the yuppies were driving, but a giant plum-colored monster with a huge roof rack, snorkel, and winch on the front. I ordered it over the Internet, and a few months later a giant tractor-trailer rolled onto the Microsoft campus and deposited my new ride at the Building 5 entrance.

Nothing makes me more nauseated than the way yuppies care for their expensive cars, so the first thing I had to do was trash my new P & J. Fortunately the Microsoft campus is *constantly* under construction, so there was no shortage of sites to rampage. Microsoft was one giant Humm-V playground, and I made sure the Saintmobile was covered in mud and had brush hanging off the fenders at all times.

The Humm-V came to present several interesting problems, however. It's popularity with visiting guests meant that many important meetings were conducted while tearing circles on a construction site with giggling executives in suits and ties hanging on for dear life in the backseat.

This all seemed like so much innocent fun—until the little disaster with Intel.

I was at Intel's local office to raise sponsorship support for my next DirectX promotion event. They said they'd heard about my Hummer and wanted a ride. Being far from a Microsoft construction site, I thought instead that we might drive down the road a mile or so to a green belt I'd noticed on the way over. I figured I'd let them think they were just going to get a little spin around the block, and then surprise them by peeling off the road into rough country. As it turned out, we were all in for a surprise.

When we reached the green belt, I made sure there was no traffic around and swung the vehicle off the road. There was a three-foot concrete drop off the road. No problem for a Hummer, but what I didn't realize was that the freshly mown grass was simply floating on the surface of a giant swamp. This was the first and only occasion on which I got to test the Hummer's snorkle. The vehicle quickly sank nose-first into the muck, its tail hung up on the concrete embankment. We were embedded in mud with no wheels touching the ground and the winch several feet under water. We all sat in silence for a moment, while I reflected on my supreme stupidity. "Don't worry," I finally said, "it's watertight, the engine will run as long as the snorkel is above water."

The Intel guys didn't seem to find this statement reassuring.

We sat for some time, watching the water lap against the windshield, until two bicycle cops happened along. We rolled down the back window, which was above water, to talk to them. One peered over his sunglasses and casually asked, "So, what *were* we thinking?"

I confessed to being an idiot.

He asked if this was a new Hummer and I said yes. He replied that he probably would have tried it himself. He called his partner over, and both of them climbed through the back window into the backseat and proceeded to admire the new interior. (I'm not kidding.) His partner pointed at the CD player and asked if it was a VCR. I turned on some music. The Intel guys just sat there, stunned. I pointed out to the cops that the vehicle seemed to be sinking, and the cop offhandedly said he'd already called a big tow truck. The cops made small talk about the vehicle among themselves, until finally, unable to contain my suspense as to when they would break out the handcuffs, I said; "Do you want to see my license or anything?" "Sure," the guy said and glanced at my license and registration without writing anything down.

The Intel guys and I were embedded in mud with no wheels touching the ground. We all sat in silence for a moment, while I reflected on my supreme stupidity.

I finally decided the Hummer had to go when I jammed it between the ceiling and the ground of the SeaTac airport parking garage. The Hummer was just under the seven-foot height limit and I'd parked it there before, but on this occasion the automatic tire inflation system had added a couple inches to the vehicle's height. After that episode, I concluded that as much fun as the Hummer was, it just wasn't practical, and sold it.

A friend tells me I can buy a working WWII Sherman tank pretty cheap, but that will probably have to be a backup vehicle.

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- ★ *Upgrade to a 6.4GB Ultra ATA Hard Drive, add $99.*
- ★ *Upgrade to 64MB SDRAM, add $99.*

$2399

$72/Mo., 48-Month Purchase Plan[33]

E•VALUE CODE: 88764-800523

Phone Hours: M-F 7a-11p • Sat-Sun 8a-8p CT
In Canada,[1] call 800-839-0148 • In Mexico,[1] call 001-800-210-7607

Pricing not discountable. [1]Prices and specifications valid in U.S. only and subject to change without notice. [2]For a complete copy of Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. [3]At-home or on-site service provided via service contract between customer and third-party provider, and is not available in certain remote areas. Technician dispatched if necessary pursuant to phone-based troubleshooting with technical support personnel. [4]For hard drives, GB means 1 billion bytes; total accessible capacity varies depending on operating environment. [5]17X Min. [6]14X Min. [7]10X Min. [10]2X Min. [11]Download speeds limited to 53Kbps. Upload speeds are less (in the 30Kbps range) and vary by modem manufacturer. Speeds also vary depending on line conditions. Analog phone line and compatible server equipment required. [13]Maximum RAM configurations require a factory installed 128MB SoDIMM, which must be installed at time of initial purchase. [14]Offers differ for AT&T WorldNet and GTE Interactive. Some charges may apply. [19]For Inspiron 3500 only. [20]Limit $100 per household. Not valid with other Hewlett Packard (HP) offers unless otherwise specified by that offer. Customer must mail in completed rebate coupon(s) and original or copy of receipt(s) dated from 5/2/99 to 7/3/99 for all products. Submissions must be postmarked no later than 8/3/99 and received no later than 8/17/99. Customer will receive rebate check, approximately 8-10 weeks after receipt of rebate materials. [21]Requires Windows 98. [22]While supplies last. [34]1X Min. Intel, the Intel Inside logo and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. MS, Microsoft, IntelliMouse and Windows are registered trademarks of Microsoft Corporation. 3Com is a registered trademark of 3Com Corporation. HP and DeskJet are registered trademarks of Hewlett Packard Corporation. Trinitron is a registered trademark of Sony Corporation. ©1999 Dell Computer Corporation. All rights reserved.

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® 895Cse, add $399 ($50 HP Mail-in Rebate[20] Available) ◆ HP ScanJet 6200, add $399

NEW DELL DIMENSION XPS T500
PENTIUM III PROCESSOR AT 500MHz

- 128MB 100MHz SDRAM
- *NEW* 9.1GB[4] Ultra ATA Hard Drive
- 17" (16.0" viewable, .26dp) M780 Monitor
- 16MB Diamond Viper TNT 3D AGP Graphics Card
- *NEW* 6X Max[10] Variable DVD-ROM Drive
- Turtle Beach Montego II A3D 320V Sound Card
- harman/kardon HK-195 Speakers
- 100MB Iomega Zip BUILT-IN Drive
- MS Natural Keyboard Elite
- MS IntelliMouse
- **Power Game Pack**[22]

★ *Upgrade to a 17" (16.0" viewable, .26dp) 1000HS Trinitron® Monitor, add $99.*

$1999

$60/Mo., 48-Month Purchase Plan[33]

E•VALUE CODE: 88764-500519

NEW DELL DIMENSION XPS T500
PENTIUM III PROCESSOR AT 500MHz

- 128MB 100MHz SDRAM
- *NEW* 20.4GB[4] Ultra ATA Hard Drive
- 17" (16.0" viewable, .26dp) 1000HS Trinitron Monitor
- 16MB Diamond Viper TNT 3D AGP Graphics Card
- *NEW* 6X Max[10] Variable DVD-ROM Drive
- Turtle Beach Montego II A3D 320V Sound Card
- *NEW* ACS-340 Speakers with Subwoofer
- 100MB Iomega Zip BUILT-IN Drive
- Dell QuietKey Keyboard
- MS IntelliMouse
- **Power Game Pack**[22]

★ *Upgrade to ACS-495 Surround Sound Speakers with Subwoofer, add $69.*

$2299

$69/Mo., 48-Month Purchase Plan[33]

E•VALUE CODE: 88764-500522j

NEW DELL DIMENSION XPS T500
PENTIUM III PROCESSOR AT 500MHz

- 128MB 100MHz SDRAM
- *NEW* 25.5GB[4] Ultra ATA Hard Drive
- 19" (18.0" viewable, .26dp) P990 Trinitron Monitor
- 16MB Diamond Viper TNT 3D AGP Graphics Card
- *NEW* 6X Max[10] Variable DVD-ROM Drive
- *NEW* SoundBlaster Live! Value 512V Sound Card
- ADA 880 Dolby Digital Speakers with Subwoofer
- 100MB Iomega Zip BUILT-IN Drive
- Dell QuietKey Keyboard
- MS IntelliMouse
- **Power Game Pack**[22]

★ *STB PCI TV/FM Tuner, add $109.*

$2799

$84/Mo., 48-Month Purchase Plan[33]

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PRE-LOADED SOFTWARE OPTIONS

Microsoft® Office 97 Small Business Edition v2.0:
(Ask about Our *FREE* MS Office 2000 Upgrade Offer) Word 97, Excel 97, Publisher 98, Outlook 98, Small Business Financial Mgr. 98 and Expedia Streets 98.

Microsoft Works Suite 99:
Word 97, Encarta Encyclopedia 99, Money 99 Basic, Works 4.5a, Works Calendar, Graphic Studio Greetings and Expedia Streets 98.

SOFTWARE BUNDLES

Fast Track Game Pack $79:
Tomb Raider 2, Jack Nicklaus Golf 5.0, Titanic: Adventure Out of Time, Hardball 6.0 and Total Annihilation.

Quicken 99 Power Bundle $79:
Quicken Deluxe 99, Quicken Financial Planner, Quicken Family Lawyer.

Windows 98 ◆ Touchpad ◆ 3-Year Limited Warranty[2] ◆ Setup Video
, add $49 ◆ APC Notebook Surge Protector, add $29

DELL INSPIRON 7000 A333GT
PENTIUM II PROCESSOR AT 333MHz

Desktop Features, Notebook Convenience

- 14.1" XGA Active Matrix Display
- 64MB SDRAM (384MB Max[13])
- 6.4GB[4] Ultra ATA Hard Drive
- Removable Combo 24X Max[7] Variable CD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE LT Pro 3D Video
- Internal 56K Capable[11] V.90 Fax Modem with Trial Offer ConnectDirect Internet Access[14]
- MS Works Suite 99 with Money 99 Basic
- Deluxe Nylon Case

★ *Upgrade to a 10GB Ultra ATA Hard Drive, add $199.*

★ *Upgrade to 128MB SDRAM, add $199.*

$2699

$81/Mo., 48-Month Purchase Plan[33]

E•VALUE CODE: 88764-800526

DELL INSPIRON 7000 A366LT
PENTIUM II PROCESSOR AT 366MHz

Desktop Features, Notebook Convenience

- 15" XGA Active Matrix Display
- 96MB SDRAM (384MB Max[13])
- 10GB[4] Ultra ATA Hard Drive
- Removable Combo 2X[34] DVD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE LT Pro 3D Video
- Internal 56K Capable[11] V.90 Fax Modem with Trial Offer ConnectDirect Internet Access[14]
- MS Office Small Business Edition

★ *Inspiron 7000 Port Replicator, add $149.*

★ *100MB Iomega Zip Internal Drive, add $139.*

★ *Second Lithium Ion Battery, add $119.*

$3499

$105/Mo., 48-Month Purchase Plan[33]

E•VALUE CODE: 88764-800534

POWER UPGRADES

RECEIVE UP TO $100 OFF WITH MAIL-IN REBATES ON THESE HP PRODUCTS WHEN PURCHASED WITH A DELL DIMENSION DESKTOP AND MONITOR. OFFER EXPIRES 7/3/99.[20]

NEW HP DESKJET 882C COLOR PRINTER

- Brilliant photo-quality printing on any paper
- Up to 8 ppm black, 5 ppm color
- Parallel or USB[21] connectivity

$299

$50 HP MAIL-IN REBATE[20] Available

NEW HP SCANJET 5200Cse SCANNER

- Single push-button scanning and copying
- USB[21] connectivity for easy installation
- 600 x 1200 dpi, 9600 dpi enhanced, 36-bit color

$299

$50 HP MAIL-IN REBATE[20] Available

APC SURGESTATION PRO8T2

- Helps protect your system against electrical surges
- 8 outlets with block spacing for 3 outlets
- Provides $10K equipment protection warranty

$39

PREMIER 3-YEAR ON-SITE[3] SERVICE

- Sends a technician to your door the next business day if necessary after phone-based troubleshooting
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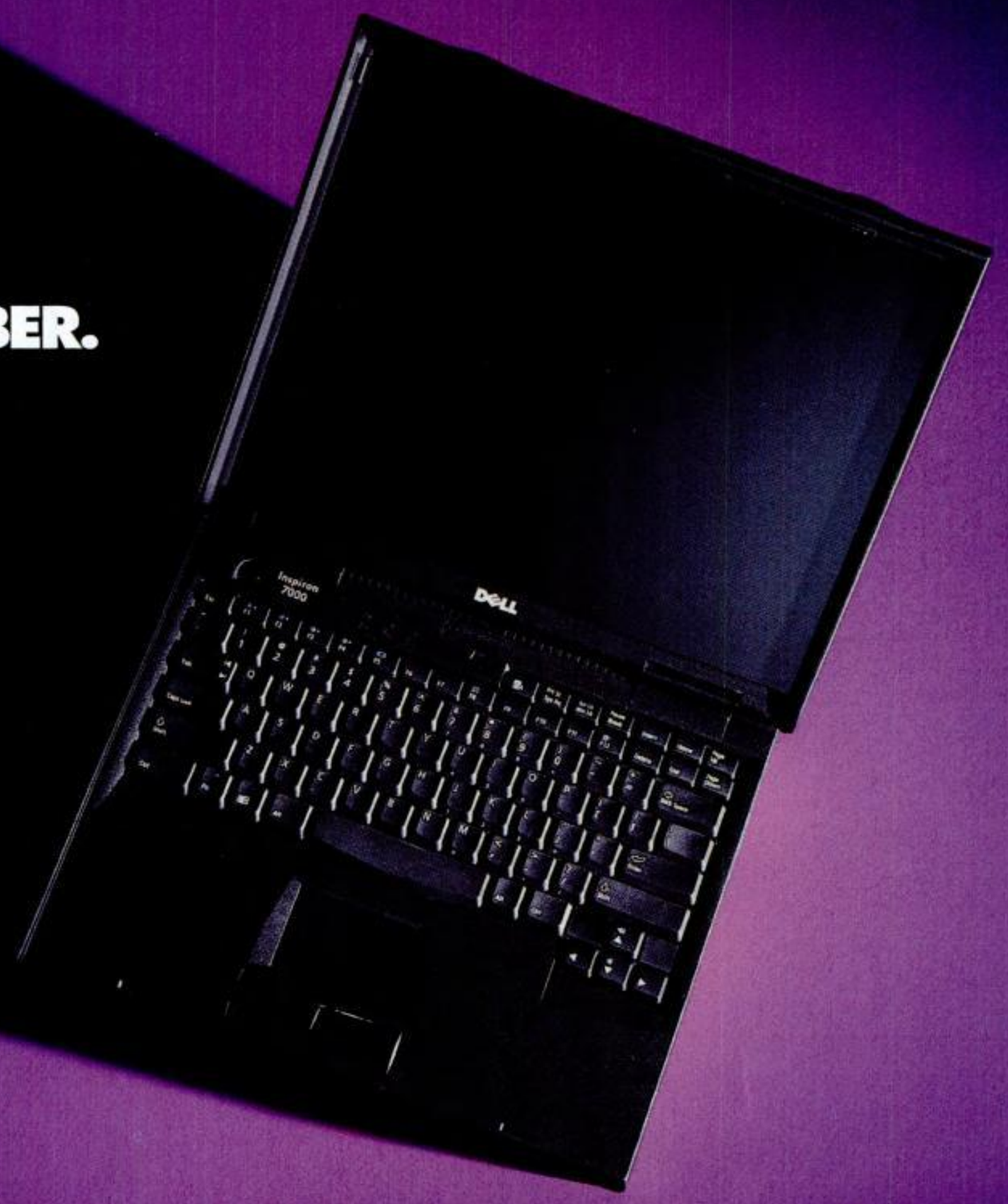

DELL® INSPIRON™ 7000 A366LT
PENTIUM® II PROCESSOR AT 366MHz

Desktop Features, Notebook Convenience

- 15" XGA Active Matrix Display
- 96MB SDRAM (384MB Max[13])
- *NEW* 10GB[4] Ultra ATA Hard Drive
- Removable Combo 2X[34] Variable DVD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE LT Pro 3D Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- Internal 56K Capable[11] V.90 Fax Modem with Trial Offer ConnectDirect℠ Internet Access[14]
- MS® Office 97 SBE (Ask about our *FREE* MS Office 2000 Upgrade Offer)
- MS Windows® 98/Touchpad
- Inspiron Setup Video/Deluxe Nylon Case
- 3-Year Limited Warranty[2]

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NEW DELL® DIMENSION® XPS T500
PENTIUM® III PROCESSOR AT 500MHz

- 128MB 100MHz SDRAM
- *NEW* 9.1GB[4] Ultra ATA Hard Drive (7200 RPM)
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- 16MB Diamond Viper TNT 3D AGP Graphics Card
- *NEW* 6X Max[10] Variable DVD-ROM Drive
- Turtle Beach Montego II A3D 320V Sound Card
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- 3Com® USRobotics V.90[11] PCI WinModem with Trial Offer ConnectDirect℠ Internet Access[14]
- 100MB Iomega Zip BUILT-IN Drive with One Disk
- MS® Works Suite 99 with Money 99 Basic; McAfee VirusScan
- MS Windows® 98/MS IntelliMouse®
- Dell QuietKey® Keyboard
- 3-Year Limited Warranty[2]
- 1-Year Next-Business-Day At-home[3] Service
- **Power Game Pack**[22]

$1999

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